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University of  
Chester

**CORONARY HEART DISEASE (CHD) KNOWLEDGE AND SELF-  
REPORTED HEALTH OF FEMALE STUDENTS ATTENDING A  
SCOTTISH COLLEGE**

*'A Dissertation Submitted in Accordance With the Requirements of  
University of Chester for the Degree of Master of Science  
Cardiovascular Rehabilitation'*

**JACQUELINE LYLE**

**SUBMITTED: September 2011**

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## **ABSTRACT**

**Purpose:** To evaluate the levels of CHD knowledge and self-reported health behaviours in first year female HSC students attending South Lanarkshire College in Scotland. Identify if a relationship exists between the students levels of CHD knowledge and their self-reported health behaviours and identify if a significant difference exists in the CHD knowledge and health behaviours of students who have undertaken a CHD knowledge module as part of their course of study compared to students who have not undertaken the CHD knowledge module as part of their course of study. As it has been suggested that knowledge may be a pre-requisite to positive health behaviour change, which is a key component in the prevention of CHD. **Methods:** First year Health and Social Care Further Education College Students at a Scottish College were asked to complete a modified CHD knowledge and self-reported health behaviour questionnaire. One-point was awarded for each CHD knowledge question answered correctly, these points were then totaled and students were given a coronary heart disease knowledge score out of a possible score of 52. One-point was also awarded for each positive health behaviour reported, which were then totaled and students were given a health behaviour score out of a possible score of 10. These scores were then used for comparison between the students. **Results:** One-hundred and eight students took part in the study. Students who received the CHD knowledge module had significantly greater CHD knowledge scores than the students who did not receive the CHD knowledge module ( $p=0.0001$ ). However, there was no significant difference between the health behaviour scores of students who had received the CHD knowledge module and students who had not received the CHD knowledge module ( $p=0.742$ ). No relationship was found between the CHD knowledge scores and health behaviour scores of all the students ( $p=0.185$ ). **Conclusion:** CHD education may be an effective intervention for increasing CHD knowledge in female students. However, this increased CHD knowledge did not promote positive lifestyle behaviours in these female students, suggesting that other interventions may be required to promote positive lifestyle behaviours.

### **DECLARATION**

*This work is original and has not been submitted previously in support of a degree qualification or other course.*

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Date

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# **CHAPTER 1**

## **INTRODUCTION**

## **CHAPTER 1: INTRODUCTION**

### **1.1 Coronary Heart Disease**

Coronary heart disease refers to the process of atherosclerosis in one or more of the coronary arteries (American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR), 2006). It has been suggested that the process of atherosclerosis is initiated with damage to the endothelium (a continuous layer of cells, which line the inner surface of the heart and blood vessels, which is typically the only tissue that is in direct contact with the blood), which exposes the underlying connective tissue, attracting blood platelets to the injury site, where they attach to the exposed connective tissue (Wilmore & Costill, 2004). These platelets then release platelet-derived growth factor, which promotes movement of smooth muscle cells from the media to the intima of the blood vessel wall, resulting in a plaque comprised of smooth muscle cells, connective tissue and debris forming at the injury site (Wilmore & Costill, 2004). This plaque then attracts lipids in the blood, particularly LDL-cholesterol, which are then deposited in the plaque, resulting in the thickening and hardening of the artery walls, which is the process known as atherosclerosis (Wilmore & Costill, 2004). This thickening and hardening of the artery walls make these arteries less elastic and as a result can increase blood pressure and the possible development of hypertension, which can cause more damage to the endothelium, promoting further atherosclerosis and the development of coronary heart disease (Frazier & Drzymkowski, 2004). The smooth internal lining of the artery can become ulcerated over the surface of the fatty deposits, which can leave a roughened surface that predisposes thrombus formation that can lead to narrowing and possible occlusion of the artery, resulting in the development of angina or a myocardial infarction (Crowley, 2007). With atherosclerosis there is also a risk of part of the atherosclerotic plaque breaking off and either narrowing or occluding the artery, which is greatly increased with hypertension (Tortora &

Derrickson, 2006). If this occurs in the coronary arteries supplying the heart this can cause angina or a myocardial infarction (Crowley, 2007).

## **1.2 Coronary Heart Disease risk in Women**

Male gender is defined as a non-modifiable risk factor for CHD, due to the increased prevalence and earlier onset of CHD in males compared to females (American Heart Association (AHA), 2010), which has resulted in CHD generally being referred to as a man's disease (Oliver-McNeil & Artinian, 2002) despite the fact that CHD is the biggest killer in females living in the United Kingdom (UK) (British Heart Foundation (BHF) Statistics Database, 2010). The lower risk in females is suggested to result from the proposed cardio-protective effects of oestrogen in pre-menopausal women (Ma, Cheng, Wu & Wong, 2009), though the precise mechanisms involved in the reduced CHD risk in pre-menopausal females is currently unclear, with studies in this area producing conflicting results (Lawlor, Ebrahim & Smith, 2002). However, once the menopause has occurred there is no difference in CHD risk between males and females (Mackay & Mensah, 2004). As a result, women presenting with CHD are generally older, present with a greater frequency of co-morbidities, suffer more severe first-time heart attacks and have a poorer prognosis than their male counterparts (McArdle, Katch & Katch, 2007). It has been suggested that although the CHD mortality rates are decreasing for men and women, they have been declining more slowly for women than for men and the numbers of women dying from CHD is increasing due to the increasing age of the population (AACVPR, 2006).

Despite these statistics the majority of females still perceive breast cancer as their greatest health risk (AACVPR, 2006), which has been suggested to have resulted from the increased government campaigns and public focus on the menopause and breast cancer risk in previous years (Oliver-McNeil & Artinian, 2002). Therefore, highlighting the need for more health campaigns and

interventions, which focus on promoting CHD knowledge and awareness in the female population (Oliver-McNeil & Artinian, 2002).

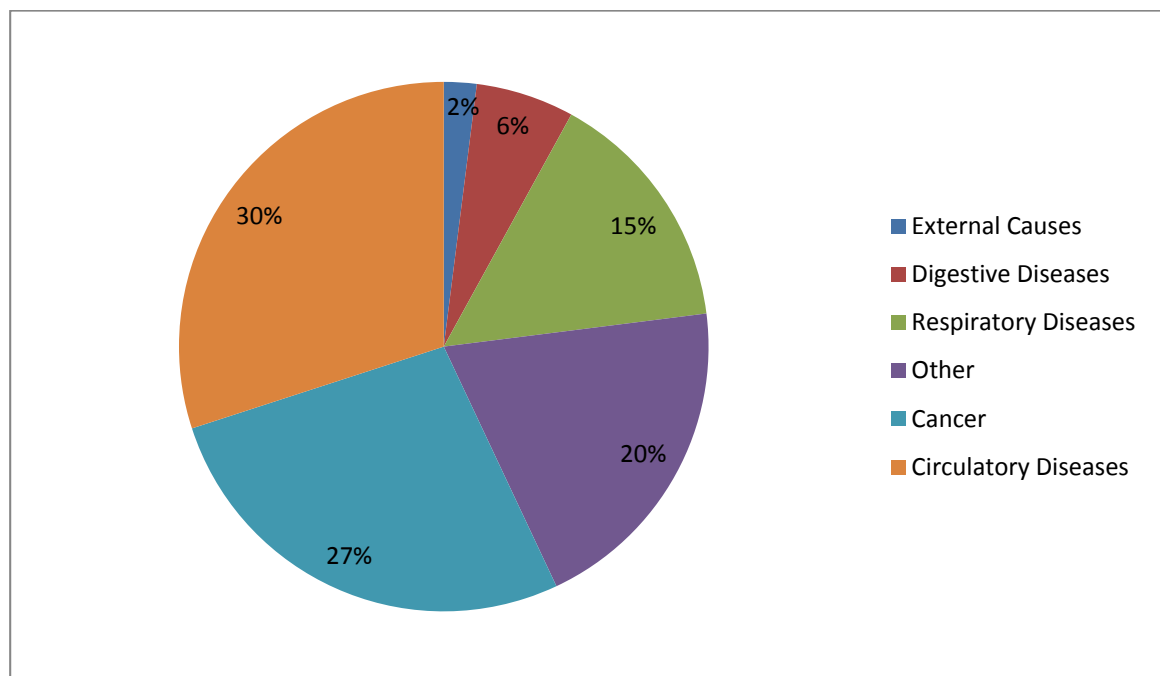
### **1.3. Coronary Heart Disease Prevalence in Women**

Heart and circulatory disease is the biggest killer in the UK accounting for one in every five deaths in women (BHF Statistics Database, 2010). With CHD accounting for almost half of all deaths from heart and circulatory disease (BHF Statistics Database, 2010). Scotland has one of the highest rates of death in females from heart and circulatory disease in the UK (BHF Statistics Database, 2010), with The General Register Office (GRO) for Scotland (2011) stating that heart and circulatory disease is currently the biggest killer for females living in Scotland (8,449 deaths in 2010) with cancer being close behind as the second biggest killer (7677 deaths in 2010) and disease of the respiratory system being the third biggest killer (3,816 deaths in 2010). Similar to the statistics for the whole of the UK, almost half of the deaths resulting from heart and circulatory disease (8,138 total deaths (42%); 3,539 females) in Scotland occurred as a direct result of CHD (GRO Scotland, 2011).

In South Lanarkshire circulatory diseases is also the biggest killer in females, with 30% of deaths in females living in South Lanarkshire in (2010) being attributable to circulatory diseases (See Figure-1) (GRO Scotland, 2011). Scotland has the highest rate of deaths from CHD in females under the age of 75-years old living in the UK with 28/100,000 deaths attributable to CHD compared to the UK average of 20/100,000 deaths attributable to CHD (BHF Statistics Database, 2010). South Lanarkshire has one of the highest rates of CHD deaths in females living in Scotland with 29/100,000 deaths in under 75 year olds attributable to CHD (BHF Statistics Database, 2010). Therefore, the rates of females under the age of 75 years old dying in South Lanarkshire from CHD is higher than both the UK's average (20/100,000 deaths) and Scotland's average (28/100,000 deaths), signifying a need for greater information about this population and effective interventions to reduce the rate of CHD



deaths in this population (BHF Statistics Database, 2010). All of which, highlights the high prevalence of CHD and death from CHD in the female population living in Scotland and the need to obtain a greater understanding of why Scotland has such a high prevalence of CHD and subsequent deaths from CHD in females and what can be done to reduce the number of females in Scotland living with and dying from CHD (Information Services Division (ISD) Scotland, Heart Disease Statistics, 2011).



**Figure 1- Cause of Deaths by category in Females living in South Lanarkshire in 2010 (General Register Office for Scotland, 2011)**

#### **1.4. Risk Factors for Coronary Heart Disease**

A risk factor can be described as “a clearly defined characteristic that has been associated with the increased rate of a subsequently occurring disease” (Dorland, 2000, p.1581). A number of risk factors have been identified that are independently and collectively associated with an increased risk of developing CHD, which include both modifiable and non-modifiable risk factors (AACVPR, 2006).

Non-modifiable risk factors refer to those risk factors that cannot be changed, which includes risk factors such as; increasing age, ethnicity, male gender and a family history of premature atherosclerosis (AACVPR, 2006). Increasing age has been defined as a non-modifiable risk factor for CHD (Scottish Intercollegiate Guidelines Network (SIGN), 2007), which is largely based on the assumption that the process of atherosclerosis and CHD development occurs over a number of years and the association that increasing age has with other risk factors such as hypertension, high blood cholesterol and diabetes mellitus (McArdle et al. 2007). Individuals of Indian, African American and Asian backgrounds/ethnicities have been suggested to elicit a greater risk of developing risk factors for CHD and subsequently CHD itself compared to individuals of White ethnicity, suggesting that ethnicity is a non-modifiable risk factor for CHD, however the precise mechanisms involved are unclear (AHA, 2010). Male gender is defined as a non-modifiable risk factor for CHD, due to the increased prevalence and earlier onset of CHD in males compared to females (AHA, 2010) and the proposed cardio-protective effects of oestrogen in pre-menopausal women (Ma et al. 2009), however, once the menopause have occurred there is no difference in CHD risk between males and females (Mackay & Mensah, 2004). A family history of CHD as defined by the occurrence of a cardiac event in a first degree relative before the age of 55 (male relative) or 65 (female relative) has also been shown to be a non-modifiable risk factor for CHD, with an increased relative risk of 1.7 to 12.9 of developing CHD compared to those without a family history of CHD (AACVPR, 2006). This increased risk with a family history of CHD suggests that genetics may also play a key role in the development of CHD risk factors and CHD itself (AACVPR, 2006).

Modifiable risk factors refer to those risk factors that can be changed, controlled or treated by the implementation of simple lifestyle changes and are the key focus of cardiac rehabilitation (AHA, 2010). There are two types of modifiable risk factors that are of particular interest to the healthcare professionals, these include; major modifiable risk factors and contributing modifiable risk factors (AACVPR, 2006).

#### **1.4.1. Major Modifiable Risk Factors**

Major risk factors are established risk factors, which have been shown to increase CHD risk (AACVPR, 2006). Table 1 provides details of the major modifiable risk factors for CHD and provides a brief description of how these risk factors increase the risk of developing CHD.

**Table-1: Major Modifiable Risk Factors**

<b>Risk Factors</b>	<b>How Does This Risk Factor Cause The Development of Coronary Heart Disease?</b>
<b>Smoking</b>	Nicotine and carbon monoxide in tobacco smoke have been suggested to have negative effects on the cardiovascular system that predispose the development of CHD, which includes; promoting catecholamine release (increasing heart rate, blood pressure and subsequent myocardial oxygen demand); causing vasoconstriction of the peripheral arteries (decreasing blood flow to the tissues); lowering threshold for ventricular fibrillation (increases risk of ventricular fibrillation); increasing platelet activation (increases risk of thrombogenesis), causing injury to the endothelium (initiating the process of atherosclerosis and the development of CHD); decreasing the oxygen carrying capacity of the red blood cells (decreasing the oxygen supply to the myocardium, which can result in an increase in blood pressure) and decreasing HDL-cholesterol whilst increasing the oxygenation of LDL-cholesterol (promoting the process of atherosclerosis and the development of CHD) (AACVPR, 2006).
<b>Diabetes Mellitus</b>	Diabetes Mellitus causes an increase in blood glucose levels, which is closely associated with high levels of blood cholesterol, the metabolic syndrome and insulin resistance/deficiency, all of which have been proposed to elicit damage to the endothelial lining and predispose individuals to the process of atherosclerosis and the subsequent development of CHD (AACVPR, 2006).
<b>High Blood Pressure (Hypertension)</b>	Hypertension in the majority of cases is due to an excessive vasoconstriction or narrowing of the arterioles, which means that the heart must pump harder to maintain a consistent blood supply around the body, resulting in an increase in blood pressure (Crowley, 2007). This increased blood pressure can cause damage to the endothelial lining of the arteries and to the myocardium of the heart, which can initiate or exacerbate the process of atherosclerosis and the development of CHD (AACVPR, 2006).
<b>High Blood Cholesterol</b>	As previously discussed, elevated levels of blood cholesterol, particularly LDL-cholesterol can increase an individual's risk of developing CHD as oxidised LDL-cholesterol has been shown to play an important role in the development of atherosclerosis and plaque formation (AACVPR, 2006). HDL-cholesterol has an opposing effect removing excess LDL-cholesterol from the arterial walls to the liver for bile synthesis before being excreted from the body, thus low quantities of HDL-cholesterol levels also pose an increased risk for atherosclerosis and CHD (McArdle et al. 2007).
<b>Overweight and Obesity</b>	Is associated with an increase in blood pressure in order to provide oxygen and nourishment to this excess adipose tissue, as well as an increased risk of developing diabetes mellitus due to the negative effects that excess adipose tissue has on insulin secretion and/or sensitivity and individuals who are overweight or obese typically eat diets high in total and saturated fats, which has an association with increased blood cholesterol (Crowley, 2007). All of which have been shown to elicit damage to the endothelial lining, initiating the process of atherosclerosis and the development of CHD (AACVPR, 2006).
<b>Physical Inactivity</b>	Physical inactivity in addition to consumption of a high calorie, high fat diet can cause individuals to become overweight and/or obese, if energy intake exceeds energy output, which as previously discussed can increase the risk of developing CHD (Crowley, 2007).

#### **1.4.2. Contributing Modifiable Risk Factors**

Contributing risk factors are risk factors, which have been suggested to play a possible role in the development of CHD (AACVPR, 2006). These include increased stress levels and excessive alcohol consumption (AHA, 2010).

Current research suggest that psychological issues such as stress may have a negative effect on the cardiovascular system, which may increase an individual's risk of developing CHD, however the precise mechanisms involved are likely to be complex and are currently unclear (AACVPR, 2006). It has been suggested that increased psychological stress activates the hypothalamic pituitary adrenocortical axis and the sympathetic nervous system, which can trigger pathophysiological mechanisms, such as; inflammation, hemostasis and altered metabolic and cardiac autonomic control, resulting in the potential increased risk of developing CHD (Brotman, Golden & Wittstein, 2007). Another theory is that increased levels of stress have an association with some of the major risk factors for CHD, including; smoking, physical inactivity and poor dietary habits, which may occur as an adaptation or coping strategy to increased stress levels, resulting in a subsequent increased risk of developing CHD (Hamer, Molloy & Stamatakis, 2008). All of which suggests that increased stress levels may have a role in the development of CHD, however further research is required in this area to support this claim and determine the precise mechanisms involved (AACVPR, 2006).

Regular alcohol consumption that exceeds the recommended weekly intake (14 units of alcohol for women and 21 units of alcohol for men) (The Health Survey for Scotland, 2010) has been associated with an increased risk of developing hypertension, diabetes mellitus, causing damage to the endothelial lining and the subsequent development of CHD, however the precise mechanisms involved remain unclear (Husain, Vazquez, Ansari, Malafa & Lalla, 2008). It has been suggested that excess alcohol consumption may elicit an inflammatory response or cause increased cholesterol oxidation, which may explain the increased CHD risk associated with excess alcohol consumption (Lucas, Brown, Wassef & Giles, 2005). However, the increased CHD risk associated with excess

alcohol consumption has been suggested to be most likely related to the association with other CHD risk factors such as hypertension, diabetes mellitus and atherosclerosis, however further research is required to support these claims and provide greater insight in to the precise mechanisms involved (Lucas et al. 2005).

### **1.5. Risk Factor Modification**

As CHD is caused by a number of risk factors, it is no surprise that the key focus of both primary and secondary prevention of CHD should focus on reducing the number and/or severity of these risk factors (AACVPR, 2006). A study by Mackay & Mensah (2004) identified that approximately 75% of risk factors were attributable to poor lifestyle choices, with research in this area suggesting that both the development of CHD and subsequent cardiac events can be prevented with positive lifestyle behaviour changes (Redfern, Ellis, Briffa & Freedman, 2006). As a result current guidelines state that risk factor modification should focus on three main lifestyle risk factors, including; physical activity and exercise; diet and weight management and smoking cessation in order to achieve good cardiovascular health and prevent the development of CHD (British Association of Cardiovascular Rehabilitation (BACR), 2007). However, in order to achieve optimum cardiovascular health individuals are required to change their behaviours and maintain these behaviour changes, which can be difficult to achieve with only 50% of cardiac patients on average adhering to these lifestyle behaviour changes (Koelewijn-Van Loon et al. 2008). Therefore, there has been an increased focus on the theories of behaviour change and the various factors that may influence behaviour change, in an effort to develop efficient risk factor modification interventions for both primary and secondary prevention of CHD, which not only promote positive lifestyle behaviour changes but also promote maintenance of these lifestyle behaviour changes (Koelewijn-Van Loon et al. 2008). One key focus in these theories of behaviour change is CHD knowledge and the role that increased CHD knowledge

plays in risk factor modification, promoting positive lifestyle behaviour changes and preventing or limiting the development of CHD (Kayaniyil et al. 2009).

## **1.6. Coronary Heart Disease Knowledge**

CHD knowledge relates to an individual's awareness about the general pathophysiology, risk factors, symptoms, prevention and treatment of CHD (Kayaniyil et al. 2009).

### **1.6.1. Coronary Heart Disease Knowledge of the General Population**

Sufficient CHD knowledge and awareness of the general public has been suggested to be an essential component in the prevention and treatment of CHD (Munoz et al. 2010). However, the CHD knowledge and awareness of the general public has been suggested to be insufficient (Sanderson et al. 2009). A study by Sanderson et al. (2009) investigated the CHD risk factor awareness and knowledge of 1747 adults living in the UK by asking participants to list the things that they believe can cause a person to develop CHD or increase their chance of developing CHD. The answers given were then coded for four lifestyle factors associated with CHD, which included; smoking, eating an unhealthy diet, drinking excessive alcohol and physical inactivity (Sanderson et al. 2009). The results of this study found that participants on average were able to identify 2.1 lifestyle risk factors for CHD, with 19% only identifying one lifestyle risk factor for CHD, 34% identifying two lifestyle risk factors for CHD, 28% identifying three lifestyle risk factors for CHD and only 9% identifying four lifestyle risk factors for CHD (Sanderson et al. 2009). Therefore, suggesting that CHD knowledge and awareness of CHD risk factors is insufficient in the general population, highlighting the need for a greater effort to promote public health messages and the development of efficient interventions aimed at increasing the CHD knowledge and awareness of the general public (Sanderson et al. 2009).

In addition to this, women in particular have been suggested to lack sufficient CHD knowledge, possibly as a result of CHD still being referred to as a man's disease (Oliver-McNeil & Artinian, 2002). A study by Thanavaro, Moore, Anthony, Narsavage & Delicath (2006) identified that the CHD knowledge scores of 120 women with no CHD history using a modified CHD knowledge test was sub-optimal with a mean score of  $11.84 \pm 3.03$  (60%) out of a possible score of 20 (100%), suggesting that women lack sufficient CHD knowledge. These findings are supported by a study by Crouch & Wilson (2010), which also identified sub-optimal CHD knowledge levels in women with only 13% of the population of women correctly identifying CHD as the leading cause of death in women, with most participants (44%) citing breast cancer as the leading cause of death in women. Thus, highlighting the lack of CHD knowledge and awareness in the female population and the need for the implementation of interventions aimed at increasing CHD knowledge and awareness in the female population (Crouch & Wilson, 2010)

#### **1.6.2. Coronary Heart Disease Knowledge of Students**

Recent research has identified an advancing prevalence in early-stage atherosclerosis in both children and adolescents, which indicates that not only do the process of atherosclerosis and the subsequent development of CHD begin in childhood and adolescent years but there has also been an increase in the prevalence of the early-stages of atherosclerosis in recent years (AACVPR, 2006). All of which highlights the importance of initiating efficient interventions to prevent the process of atherosclerosis and the development of CHD in the childhood and adolescent years as well as in the adult years (AACVPR, 2006). In addition to this, college and university students have become of considerable interest to researchers in this area, as it has been suggested that this is a critical period in an individual's life where the individual undertakes a dynamic transition period that bridges the individual's development from childhood into adulthood (Lee & Loke, 2005 & Rozmus, Evans, Wysochansky & Mixon, 2005). During this period it has been suggested that individuals begin to



assume greater responsibility for their own health and greater autonomy and control over their lifestyle choices and health behaviours (Can et al. 2008). As the CHD knowledge of an individual has been suggested to affect the process of behaviour change this has also become a key focus in this area of study (Kayaniyil et al. 2009). There have been a limited number of studies in this area, which have aimed to identify the CHD knowledge levels of college students with the majority of these studies producing mixed results, advocating the need for more studies in this area (Munoz et al. 2010).

The results of a study by Koutoubi, Huffman, Ciccazzo, Himburg & Johnson (2005), which aimed to identify the CHD risk factor knowledge of tri-ethnic college students, suggested that the tri-ethnic students were knowledgeable about risk factors for CHD (mean percentage of correctly answered CHD risk factor knowledge questions of all students was  $70.7 \pm 7.9\%$ ). With 98.3% of students correctly identifying high blood pressure, high blood cholesterol, smoking, obesity and physical inactivity as CHD risk factors, which suggests that college students have sufficient CHD knowledge levels (Koutoubi et al. 2005). However, other studies in this area have suggested that students' CHD knowledge levels may be suboptimal, with several studies identifying gaps in the students' CHD knowledge (Munoz et al. 2010). A study by Munoz et al. (2010) investigated the awareness of CHD in 320 female college students. This study identified that a considerable proportion of students possessed gaps in their awareness and knowledge of CHD, with almost a third (32%) of students incorrectly identifying breast cancer as the greatest risk to women and only 37% of students correctly identifying CHD/heart attack as the greatest risk to women despite 55% of students correctly identifying CHD/heart attack as the leading cause of death in women and only 19% of students incorrectly identifying breast cancer as the leading cause of death in women (Munoz et al. 2010).

### **1.6.3. Coronary Heart Disease Knowledge of Healthcare Professionals**

Healthcare professionals play a key role in the primary and secondary prevention of CHD, through delivering health promotion interventions, improving individuals CHD knowledge levels through educational interventions and promoting CHD risk factor modification through various interventions (Pregler et al. 2009). Based on the assumption that CHD education may increase an individual's knowledge of CHD (Kayaniyil et al. 2009), it can be assumed that healthcare professionals who have received CHD education as part of their training will exhibit greater levels of CHD knowledge than the general population. A study by Pregler et al. (2009) investigated the pre-test and post-test CHD knowledge of 1285 healthcare professionals who had attended a continuing medical education programme, which lasted one-hour and was based on the AHA (2004) guidelines for cardiovascular disease prevention in women, in an effort to identify the current CHD knowledge levels of this group of healthcare professionals and the effect that a single hour long CHD educational intervention has on the CHD knowledge levels of the healthcare professionals. This study revealed that healthcare professionals on average answered 5.1 out of a possible 8 CHD knowledge questions correctly on the pre-test, with significant knowledge deficits evident ( $p < 0.001$ ) (as defined by greater than 20% of participants providing a specific wrong answer), which suggests that the CHD knowledge of healthcare professionals prior to the educational programme was insufficient and suboptimal (Pregler et al. 2009). This study also identified significant improvements in CHD knowledge post-test, with healthcare professionals on average answering 6.8 out of a possible 8 CHD knowledge questions correctly, with significant improvements in the knowledge deficits for all questions ( $p < 0.001$ ), thus supporting the role of CHD education in increasing CHD knowledge in healthcare professionals (Pregler et al. 2009). However, as this study had no follow-up it is unclear whether these gains in CHD knowledge were short-term or long-term, advocating the need for more longitudinal studies in this area (Pregler et al. 2009).

#### **1.6.4. Coronary Heart Disease Knowledge of Cardiac Patients**

CHD knowledge of cardiac patients has been suggested to influence their attitudes towards CHD, ability to recognise symptoms of CHD, perceived need for physician screening and provide motivation for individual behaviour changes, which advocates the need for cardiac patients to obtain sufficient levels of CHD knowledge (Kayaniyil et al. 2009). Despite the proposed benefits of increasing cardiac patients CHD knowledge there is limited research, which has examined the CHD knowledge levels of cardiac patients (Khan et al. 2006 & Redfern, Ellis, Briffa & Freedman, 2007). However, of the limited studies in this area the majority have suggested that the CHD knowledge of cardiac patients is insufficient and suboptimal, advocating the need for the implementation of efficient interventions to increase cardiac patients CHD knowledge levels (Assiri, 2003 & Kayaniyil et al. 2009).

A study by Assiri, (2003) assessed the CHD knowledge of all patients admitted to the Coronary Care Unit of Aseer Central Hospital in Abha, Saudi Arabia, between January (2000) and February (2001) using a structured pre-tested questionnaire. This study identified that the CHD knowledge scores of cardiac patients was generally poor with 70.4% of respondents possessing a poor CHD knowledge score (defined as a CHD knowledge score less than 20 out of a possible 25) and only 29.6% of respondents possessing a good CHD knowledge score (defined as a CHD knowledge score greater than 20 out of a possible score of 25), indicating the need for greater educational interventions to promote increased CHD knowledge in cardiac patients (Assiri, 2003). This is supported by a study by Kayaniyil et al. (2009), which investigated the CHD awareness, symptom, risk factor and treatment knowledge of 1308 CHD inpatients, recruited from 11 acute care sites in Ontario, Canada. This study indicated that awareness of CHD is not optimal in CHD patients and CHD patients have only moderate levels of CHD knowledge, which again advocates the need for greater educational interventions to increase CHD patients awareness and knowledge of CHD in CHD patients (Kayaniyil et al. 2009).

### **1.7. Self-Reported Health Behaviours**

Health behaviours are defined as “self-initiated actions that serve to maintain or enhance the level of wellness, self-actualisation and fulfilment of the individual” (Can et al. 2008, p. 273). This includes stopping smoking, making healthier food choices, becoming more physically active and consuming alcohol in moderation (Byrne, Walsh & Murphy, 2005).

### **1.8. The Association Between Knowledge and Health Behaviours**

There have been a number of theories developed to aid our understanding of how behaviour change occurs and the various factors that can influence behaviour change (Weinberg & Gould, 2003). Of particular interest is the role that increased CHD knowledge may have on promoting positive health behaviour change, as it has been suggested that increasing CHD knowledge through various educational interventions may be effective at promoting and maintaining positive health behaviours in both primary and secondary prevention of CHD (Horowitz, Rein & Leventhal, 2004).

The health belief model is the most common theory used to explain this association between knowledge and health behaviours (Weinberg & Gould, 2003). The health belief model is composed of five factors, which have been proposed to influence an individual’s health behaviours, including; individuals perceived severity of the disease; perceived susceptibility to the disease; perceived threat of the disease; perceived benefits of taking action; and perceived barriers to taking preventative action (Sharifirad, Entezari, Kamran & Azadbakht, 2009). This model therefore proposes that the likelihood of an individual partaking in preventative health behaviours (such as physical activity) is dependent upon the individuals’ perception of their susceptibility to the disease, their perceived severity of the disease, their perceived barriers to taking action and their understanding of the cost and benefits associated with taking action (Weinberg & Gould, 2003).

With individuals who perceive that they are at risk of the disease, that the disease has severe consequences for them, that they can successfully overcome the barriers to taking action and that the pros of taking action far outweigh the cons, being more likely to embrace the target health behaviours (Weinberg & Gould, 2003).

Although the precise mechanisms involved are unclear, it has been suggested that increasing individuals CHD knowledge, through various educational interventions, may have a beneficial effect on individuals perceived susceptibility to CHD, perceived severity of CHD, perceived threat of CHD, perceived benefits of taking action, perceived barriers to taking action and as a result will promote positive health behaviour changes (Sharifirad et al. 2009). A study by Sharifirad et al (2009) investigated the role of nutrition based educational interventions on nutrition knowledge, health belief model components and nutritional practice in individuals with type-2 diabetes. This study identified that two educational sessions on nutrition, each lasting eighty minutes significantly increased nutritional knowledge in the intervention group (mean difference (MD) from baseline to follow-up  $22.68 \pm 15.90$ ,  $p < 0.001$ ) compared to the control group (MD  $-2.27 \pm 17.30$ ,  $p < 0.001$ ) (Sharifirad et al. 2009). In addition, perceived susceptibility to an ill health condition increased (MD  $29.6 \pm 18.5$ ,  $p < 0.001$ ) compared to control (MD  $-2.6 \pm 14.0$ ,  $p < 0.001$ ), perceived severity of this ill health condition increased (MD  $27.5 \pm 18.5$ ,  $p < 0.001$ ) compared to control (MD  $3.9 \pm 17.2$ ,  $p < 0.001$ ), perceived threat of this ill health condition increased (MD  $28.5 \pm 13.0$ ,  $p < 0.001$ ) compared to control (MD  $0.6 \pm 11.1$ ,  $p < 0.001$ ) and perceived benefits of taking action increased (MD  $21.1 \pm 16.3$ ,  $p < 0.001$ ) compared to control (MD  $-3.1 \pm 18.9$ ,  $p < 0.001$ ) (Sharifirad et al. 2009). Whilst perceived barriers to taking action decreased (MD  $-14.7 \pm 13.3$ ,  $p < 0.001$ ) compared to control (MD  $0.9 \pm 13.9$ ,  $p < 0.001$ ), behaviour grades increased with the intervention group (MD  $34.61 \pm 14.93$ ,  $p < 0.001$ ) compared to control (MD  $-0.23 \pm 8.52$ ,  $p < 0.001$ ) and fasting blood glucose levels significantly decreased with intervention (MD  $-33.4 \pm 32.3$ ,  $p < 0.001$ ) compared to control (MD  $-8.7 \pm 34.7$ ,  $p < 0.001$ ) (Sharifirad et al. 2009). All of which suggests that educational interventions may be effective at increasing patient knowledge of their condition and subsequent perceived susceptibility

to an ill health condition, perceived severity of this ill health condition, perceived threat of the consequences of this ill health condition, perceived benefits of positive health behaviour changes, whilst decreasing perceived barriers to health behaviour change and thus promoting positive health behaviour change and health outcomes (Sharifirad et al. 2009). Therefore, supporting the role of education in increasing individual's disease knowledge and promoting positive lifestyle behaviour changes (Sharifirad et al. 2009). However like most studies in this area this study had a very short follow-up period of only one-month, thus no conclusion can be drawn from this study with regards to the long-term effects of educational interventions on positive lifestyle behaviour changes (Sharifirad et al. 2009).

In addition to this, a number of studies have acknowledged significant levels of misconceptions and faulty beliefs about cardiac illness in individuals with and without diagnosed CHD (Sykes, Nelson & Marshall, 2006 & Furze, Dumville, Miles, Irvine, Thompson & Lewin, 2009), which has been suggested to hinder behaviour change and endorse poor functional and psychological outcomes (Goulding, Furze & Birks, 2010). This process can be explained by Leventhal's Common Sense Model, which suggests that individuals are problem solvers and they possess an active processing system that allows them to respond to an illness threat in three recurring stages; illness representation, coping and appraisal (Leventhal, Nerenz & Steele, 1984). During the illness representation stage individuals will independently develop both a cognitive and emotional reaction to this health threat, based on information they have obtained from previous social communication and cultural knowledge of the illness, information obtained from the external social environment provided by perceived significant others (i.e. health professionals) and information obtained from the individuals current experience of the illness (Leventhal et al. 1984). This information is then interpreted by the individual and links are formed between the abstract and concrete information provided, which allows the individual to 'make sense of' or form a cognitive representation/belief of their illness (Leventhal et al. 1984). There is now a wealth of evidence suggesting that these illness representations consist of five distinct but interrelated components,

which include; cause, consequences, identity, timeline and cure/control (Petrie, Cameron, Ellis, Buick & Weinman, 2002). This illness representation then guides the coping strategies employed, which can affect the illness outcomes (Leventhal et al. 1984). During the appraisal stage the feedback generated can be used to create new illness representations and coping strategies, thus forming a self-regulatory feedback loop (Leventhal et al. 1984).

Therefore if the individual receives inaccurate or insufficient information, this can result in them adopting a misconceived or maladaptive illness representation where they perceive their condition to be less severe than it actually is, underestimate the consequences of continuing with these poor lifestyle choices and are less likely to perceive behaviour change as being beneficial to them (Weinberg & Gould, 2003). Subsequently they develop misconceived or maladaptive coping strategies, which can affect emotional response (such as fear and anxiety) and can possibly cause a faulty appraisal and feedback loop, hindering future illness representations (Furze, Roebuck, Bull, Lewin & Thompson, 2002). All of which has been suggested to produce a negative effect on behaviour change (Furze et al. 2002), which is possibly due to the direct link between illness representations, coping strategies and behaviour change outcomes identified in a systematic review of empirical studies that adopted Leventhal's common sense model (Hagger & Orbell, 2003).

It has been suggested that improving patient knowledge of CHD through educational interventions, such as those described by the BACR (2007), is key to eradicating these common misconceptions and faulty beliefs and thus promoting/maintaining positive health behaviour changes (Kayaniyil et al. 2009). Studies by Alm-Roijer, Stagmo, Uden & Erhardt (2004) and Alm-Roijer, Fridlund, Stagmo & Erhardt (2006) have established a positive relationship between patient knowledge of associated risk factors and positive lifestyle behaviours. Therefore current research in this area suggests that knowledge may be a pre-requisite to the instigation and maintenance of positive health behaviours in both primary and secondary prevention of CHD (Kayaniyil et al. 2009).

### 1.9. Rational for Study

Scotland has the highest rate of deaths from CHD in females living in the UK with 28/100,000 deaths in women under 75 year old (UK average 20/100,000 deaths) (BHF Statistics Database, 2010), which highlights the need for greater understanding of why CHD prevalence is so high in this population and what interventions may be implemented that could benefit this population (BHF Statistics Database, 2010). South Lanarkshire has one of the highest rates of CHD deaths in females living in Scotland with 29/100,000 deaths in under 75 years old (BHF Statistics Database, 2010). Therefore the rates of females under the age of 75 years old dying in South Lanarkshire from CHD is considerably higher than the UK average (20/100,000 deaths) and also Scotland's average (28/100,000 deaths), signifying a need for greater information about this population and effective interventions to reduce the rate of CHD deaths in this population (BHF Statistics Database, 2010). Education is one intervention that is currently used in primary and secondary prevention in cardiac rehabilitation as it has been proposed that various educational approaches may increase individual's knowledge of CHD and its risk factors (Marvaki et al. 2007). This may be beneficial as increased knowledge has been suggested to be a pre-requisite to behaviour change, thus increasing an individual's CHD knowledge through various educational approaches may result in the individual adopting a healthier lifestyle and a subsequent reduced risk of developing CHD or a cardiac event (Jafary et al. 2005). Current research suggests that CHD knowledge in the general population is generally poor, particularly in females (Sanderson, Waller, Jarvis, Humphries & Wardle, 2009). However the role of education based interventions in improving CHD knowledge and behaviour modification is debatable, with current research producing conflicting results (Kang, Yang & Kim, 2010, Jones, 2010 & Steptoe & Wardle, 2001). Therefore, as no similar study exists involving a Scottish population, it is important to identify the level of CHD knowledge and positive health behaviours in female students at South Lanarkshire College in order to gain a greater understanding of this population and their risk of CHD. Comparing the CHD knowledge and health behaviours of students who have undertaken a module aimed at increasing their CHD knowledge through



educational interventions with students who have not undertaken this module should provide a greater understanding of the role that CHD education plays CHD knowledge and positive health behaviours in female students attending South Lanarkshire College. The results of this study can provide significant insight into this population and possible interventions to improve the health of female students and reduce their future risk of CHD. As no similar study has been conducted in Scotland, this study may provide a greater insight into the possible reasons for Scotland having the highest CHD death rates in the UK and the possible benefit of CHD education as a preventative method.

#### **1.10. Study Aims**

Therefore the aims of the present study were to evaluate the levels of CHD knowledge and self-reported health behaviours in first year female HSC students attending South Lanarkshire College in Scotland. Identify if a relationship exists between the students levels of CHD knowledge and their self-reported health behaviours and identify if a significant difference exists in the CHD knowledge and health behaviours of students who have undertaken a CHD knowledge module as part of their course of study compared to students who have not undertaken the CHD knowledge module as part of their course of study.

## **1.11. Hypotheses**

### **1.11.1. Experimental Hypotheses**

1. Students who have undertaken a CHD knowledge module as part of their course of study will have had greater education in this subject, thus they will demonstrate greater levels of CHD knowledge than students who have not undertaken a CHD knowledge module as part of their course of study
2. Students who have undertaken a CHD knowledge module as part of their course of study will demonstrate more positive health behaviours than students who have not undertaken a CHD knowledge module as part of their course of study
3. A positive relationship exists between CHD knowledge and positive self-reported health behaviours in first year (FE) female college students

### **1.11.2 Null Hypotheses**

1. Students who have undertaken a CHD knowledge module as part of their course of study will not demonstrate greater levels of CHD knowledge than students who have not undertaken a CHD knowledge module as part of their course of study
2. Students who have undertaken a CHD knowledge module as part of their course of study will not demonstrate more positive health behaviours than students who have not undertaken a CHD knowledge module as part of their course of study
3. No relationship exists between CHD knowledge and positive self-reported health behaviours in first year (FE) female college students

# **CHAPTER 2**

## **METHODS**

## **CHAPTER 2: METHOD**

### **2.1 Introduction to Methods**

The purpose of the methods chapter is to communicate and rationalise the methods employed in the present study. Taking into consideration the participants from whom information regarding their CHD knowledge and self-reported health behaviour was collected from, the study design applied, the procedures and tools used to collect information about the participants CHD knowledge and self-reported health behaviours and the type of statistical analyses used to interpret the findings from this study.

### **2.2 Participants**

The sample comprised of 120 female health and social care (HSC) students aged over 16-years old attending a Scottish Further Education (FE) College, who were approaching the end of their first year of study. Male students were excluded from the study due to the low numbers of male students enrolled in courses from the HSC department. The HSC department at South Lanarkshire College in Scotland currently has 120 female students meeting the study criteria (female, aged over 16-years old, attending a course from the HSC department at a Scottish College), 64 students were undertaking the access to nursing or healthcare courses and 56 students undertaking the care or social care courses. First year HSC students were selected to participate in this study based on the understanding that within the health and social care department CHD knowledge is taught as a module to the access to nursing and health care students as part of their course in their first year of college in accordance with the Scottish Qualifications Authority (SQA) Framework and the CHD knowledge course is not taught to the care and social care students (informal communication with representatives from the College, May 2011). This provides a baseline for comparison of CHD knowledge and associated health behaviours in students who have undertaken an educational

module aimed at improving students' coronary heart disease knowledge and students who have not undertaken this CHD knowledge module. Therefore, by inviting all female students in the HSC department to participate in this study this provided two equally sized groups for comparison and ensured that all students who met the study criteria and who wanted to participate in the study were given the opportunity.

### **2.3 Study Design**

The independent variable was CHD knowledge and the dependent variable was self-reported health behaviours. An independent samples design was used, with the participants who were all female first year (FE) college students at South Lanarkshire College, being split in to two-groups; those who have undertaken the CHD module and those who have not undertaken the CHD knowledge module. The criteria for this study sample were female college students aged 16 years old and over, studying a course from the HSE department at South Lanarkshire College in Scotland. Participants were excluded if they reported a personal history of heart or cardiovascular disease, as it has been suggested that these individuals may have been exposed to other treatments, which could have altered their CHD knowledge or self-reported health behaviours other than the CHD knowledge module (Kayaniyil et al. 2009). The participants were recruited with the help of Wilma MacLeod, the Deputy Head of the HSC department from South Lanarkshire College, who was introduced to the study and agreed to take part in it (See Appendix 1). A convenience sampling method was used with study participants recruited during lecture times in the lecture halls on the premises of South Lanarkshire College. All 120 female first year (FE) college students from the department of HSC at South Lanarkshire College were approached and asked to participate in the study.

## 2.4 Materials

Following a review of the methods available for data collection and the methods of data collection used in similar research studies, it was decided that the questionnaire would be the chosen method of data collection for the present research study. As there is no robust CHD knowledge and health behaviour questionnaire in non-patient populations (Kayaniyil et al. 2009) the data from the present study was collected using a modified questionnaire (See Appendix 2), which included questions from the Heart Disease Fact Questionnaire (Wagner, Lacey, Chyun & Abbott, 2005), the CHD Awareness and Knowledge Questionnaire (Kayaniyil et al. 2009), the British Heart Foundations Lifestyle Test (2011), the self-reported health behaviour questions (Steptoe & Wardle, 2001) and the Nutrition Knowledge Questionnaire (Hawkes & Nowak, 1998). Only the Heart Disease Fact Questionnaire (Wagner et al. 2005) and the Nutrition Knowledge Questionnaire (Hawkes & Nowak, 1998) are validated questionnaires, however the above Questionnaires have been used in a number of similar research studies (Kang et al. 2010, Metintas, Arian & Kalyoncu, 2009 & Steptoe and Wardle, 2001). Some minor changes were made to the questions included in the modified CHD knowledge and self-reported health behaviour questionnaire in order to reflect the nature of the study as follows. The block of demographic data was amended to consider the population being studied. Question 13 was changed from requesting student's average daily intake of alcohol to their average weekly intake of alcohol to provide a greater insight into the level of alcohol consumption in this student population. Examples of foods high in fibre and saturated fat were added to questions 14 and 15 to provide clarification of what these questions were asking the students and the wording of question 17 was changed from '*do **you** regularly add salt to your meals when cooking them*' to '*do **you or the person who cooks your meals** regularly add salt when cooking them*' in order to consider the students who may live at home and have their meals cooked by a relative. The wording of questions 20 and 21, which were used to assess the participant's knowledge of the leading cause of death, was also altered due to recent changes in the leading cause of death (BHF Statistics Database, 2010).

The modified CHD knowledge and self-reported health behaviour questionnaire, consisted of fifty questions split in to three sections; demographics (five questions), personal health/self-reported health behaviours (thirteen questions) and CHD knowledge (thirty-two questions) (See Appendix 2). The demographics of the modified CHD knowledge and self-reported health behaviours questionnaire established the first year HSC students' personal history of CHD, family history of CHD, age, ethnicity and whether they had covered any health or nutrition based modules as part of their course of study. The personal health section of the modified CHD knowledge and self-reported health behaviours questionnaire addressed the students' self-reported health behaviours, which included, questions about the students diet/weight management, smoking status, physical activity/exercise levels and stress levels. The final section of the modified CHD knowledge and self-reported health behaviours questionnaire was the CHD knowledge section, however as previously discussed there is no robust measure of CHD knowledge for non-patients, thus in order to attain the students' level of CHD knowledge a combination of items were included in this section from the Heart Disease Fact Questionnaire (Wagner et al. 2005), the CHD Awareness and Knowledge Questionnaire (Kayaniyil et al. 2009) and the Nutrition Knowledge Questionnaire (Hawkes & Nowak, 1998). The scoring of the modified CHD knowledge and self-reported health behaviour questionnaire was split into two sections.

Section one identified students' level of CHD knowledge, with one point being awarded for each CHD knowledge question answered correctly, as there were 32 CHD knowledge questions and some of these questions had multiple correct answers the CHD knowledge section was scored out of a possible 52 points, where the lowest score of zero represented no correct answers and the highest score of 52 represented all correct answers. Higher CHD knowledge scores representing students with greater CHD knowledge (Kayaniyil et al. 2009).

Section two identified the students' self-reported health behaviours, which were scored using a healthy lifestyle index (Steptoe & Wardle, 2001), with each healthy behaviour being given a

score of one and each unhealthy behaviour being given a score of zero. These scores were then collated and a score out of a possible ten points was provided for each student, where a score of zero represents no healthy behaviours and a score of ten represents all healthy behaviours. With a higher score indicating a greater number of positive health behaviours (Stephoe & Wardle, 2001).

## **2.5 Procedure**

Following confirmation by the College (See Appendix 1) and ethical approval by the University of Chester, Faculty of Applied Sciences, Ethics Committee (See Appendix 3) a pilot study was performed, which demonstrated that completing this questionnaire should take no longer than 15-minutes. All participants were informed of the study via a participant information sheet (See Appendix 4), which was explained to them and distributed to all first year HSC students one-week prior to the study taking place. This study took place over two consecutive days to allow all data collection to take place. All 120 female first year (FE) HSC students met the inclusion criteria and were invited to participate in the study, during class time in the lecture rooms of South Lanarkshire College. Students were informed that it was their decision whether to participate in the study or not, they could withdraw from the study at any point and it would not affect them in any way if they chose not to participate or withdraw from the study. Of the 120 students invited to participate in the study, 108 students agreed to participate in the study and 12-students declined to participate in the study. Students who declined to participate in the study were issued with word searches and puzzles to complete instead. All students volunteering to participate in the study were informed that their responses would be kept confidential as the questionnaire responses were anonymous and by completing the questionnaire they were providing their consent to participate in the study. The participants were then asked to complete all three sections of the questionnaire, which should take no longer than 15-minutes to complete and return the completed questionnaires to the researcher. Following completion of the questionnaire all 120 students were thanked for their time and given a



detailed copy of the answers to the CHD knowledge questions (See Appendix 5), which may increase their knowledge and understanding of CHD.

## **2.6 Statistical Analyses**

All data was analysed using the Statistical Package for Social Science (SPSS) for Windows version 18.0 (2010). This study compared two-groups; students who have undertaken a CHD knowledge module as part of their College course and students who have not undertaken a CHD knowledge module as part of their course (independent variable) on two dependent-variables (CHD knowledge and self-reported health behaviours). The CHD knowledge (determined by the students CHD knowledge score) and self-reported health behaviours (determine by the students self-reported health behaviour score) of the students were determined using descriptive statistics. The CHD knowledge scores and self-reported health behaviour scores of the students were analysed to determine if there was a difference in CHD knowledge and self-reported health behaviours between students who have undertaken a module aimed at increasing their CHD knowledge as part of their College course and those who had not undertaken this module as part of their College course. As this data is of ratio level and this study used an independent samples design the Independent Sample T-tests was the statistical test chosen (Hicks, 1995). The CHD knowledge scores and the health behaviour scores of all students were then analysed to identify if a relationship existed between a participants level of CHD knowledge and their self-reported health behaviours. As this data is of ratio level the Pearson's Correlation was the statistical test chosen (Hicks, 1995).

# **CHAPTER 3**

## **RESULTS**

## **CHAPTER 3: Results**

### **3.1. Introduction to results**

This section presents the demographics of the students participating in the present study and the outcomes of CHD knowledge and health behaviours in relation to the aims and hypotheses of the present study. This includes details of the overall CHD knowledge and self-reported health behaviours of the first year students, whether any difference exists in the CHD knowledge and self-reported health behaviours of students who have undertaken the CHD knowledge module and those who have not and whether there is evidence to suggest that an association exists between CHD knowledge and health behaviours.

### **3.2. Demographics**

One-hundred and eight out of a potential one-hundred and twenty first year HSC students volunteered to participate in the present study and completed the modified CHD knowledge and self-reported health behaviour questionnaire, which corresponds to a 90% response rate. There were 60 first year students from the access to nursing and healthcare courses (had undertaken the CHD knowledge module as part of their course of study) and 48 students from the care and social care courses (had received no CHD knowledge module as part of their course of study). The age of the students participating in the study had a range of 37, ranging from 17-54 years old with a median age of 21 years old. With the students in the group who had undertaken the CHD knowledge module as part of their course of study (range of 30, ranging from 17-47 years old, median age= 22 years old) being of similar age to the group of students who had not undertaken any CHD knowledge module as part of their course of study (range of 37, ranging from 17-54 years old, median age= 20 years old). The majority of participants in this study were of White ethnicity (94%, n=102), with a minority

of participants of Asian (4%, n=4) and Mixed (2%, n=2) ethnicity. No students reported having a personal history of CHD in this study, however 14-students (13%) did report having a family history of CHD, with six-students (10%) in the group who had undertaken the CHD knowledge module as part of their course stating that they had a family history of CHD and eight-students (17%) in the group who had not undertaken any CHD knowledge module as part of their course of study. All of which indicates that the demographics of the students were similar across both student groups.

### **3.3. Coronary Heart Disease Knowledge**

One-point was awarded to students for each CHD knowledge question answered correctly; these points were then collated to give students a CHD knowledge score out of a possible score of 52. The range of the CHD knowledge scores of first year female HSC students was 29, ranging from a score of 19-48, with a median score of 34 (65%) out of a possible score of 52 (100%). Tables 2 and 3 demonstrate that the majority (44/52) of CHD knowledge questions were answered correctly by the first year female health and social care students. There were seven questions where the majority of students answered incorrectly; question 21 (n=59, 54.6%), question 22e (n=92, 85.2%), question 22h (n=65, 60.2%), question 24 (n=74, 68.5%), question 25a (n=77, 71.3%), question 45 (n=35, 32.4%) and question 50 (n=53, 49.1%) (See tables 2 and 3). Question 48 was answered correctly by all first year female HSC students (n=108, 100%) and seven questions were answered correctly by over 90% of the study population; question 22a (n=105, 97.2%), question 22d (n=98, 90.7%), question 25h (n=103, 95.4%), question 32 (n=102, 94.4%), question 38 (n=107, 99.1%), question 39 (n=103, 95.4%) and question 40 (n=99, 91.7%) (See tables 2 and 3).

**Table 2- Summary of Coronary Heart Disease Knowledge Questions (Questions 19-26)**

<b>Question</b>	<b>Correct Answer n (%)</b>	<b>Incorrect Answer n (%)</b>	<b>Do Not Know Answer n (%)</b>	<b>Missing Data n (%)</b>
19. What is Coronary Heart Disease?	62 (57.4)	36 (33.3)	10 (9.3)	0 (0)
20. What do you think presents the greatest risk of death in men?	85 (78.7)	19 (17.6)	4 (3.7)	0 (0)
21. What do you think presents the greatest risk of death in women?	44 (40.7)	59 (54.6)	4 (3.7)	1 (0.9)
22a. To reduce your blood cholesterol level do you think you should eat less cakes and biscuits?	105 (97.2)	1 (0.9)	2 (1.9)	0 (0)
22b. To reduce your blood cholesterol level do you think you should eat less skimmed milk?	87 (80.6)	9 (8.3)	9 (8.3)	3 (2.8)
22c. To reduce your blood cholesterol level do you think you should eat less ice cream?	76 (70.4)	11 (10.2)	20 (18.5)	1 (0.9)
22d. To reduce your blood cholesterol level do you think you should eat less fat on meat?	98 (90.7)	6 (5.6)	4 (3.7)	0 (0)
22e. To reduce your blood cholesterol level do you think you should eat less sugar?	9 (8.3)	92 (85.2)	7 (6.5)	0 (0)
22f. To reduce your blood cholesterol level do you think you should eat less bread?	69 (63.9)	22 (20.4)	15 (13.9)	2 (1.9)
22g. To reduce your blood cholesterol level do you think you should eat less peanuts?	53 (49.1)	26 (24.1)	26 (24.1)	3 (2.8)
22h. To reduce your blood cholesterol level do you think you should eat less coconut?	14 (13)	65 (60.2)	25 (23.1)	4 (3.7)
22i. To reduce your blood cholesterol level do you think you should eat less avocado?	82 (75.9)	4 (3.7)	17 (15.7)	5 (4.6)
Q23. To reduce your cholesterol it is important to eat less; cholesterol or saturated fat?	79 (73.1)	20 (18.5)	9 (8.3)	0 (0)
Q24. Which has less fat; butter, margarine or they are equal?	15 (13.9)	74 (68.5)	18 (16.7)	1 (0.9)
Q25a. Is museli low in fat?	13 (12)	77 (71.3)	18 (16.7)	0 (0)
Q25b. Is spaghetti low in fat?	63 (58.3)	36 (33.3)	9 (8.3)	0 (0)
Q25c. Is rice low in fat?	80 (74.1)	20 (18.5)	7 (6.5)	1 (0.9)
Q25d. Is bread low in fat?	68 (63)	32 (29.6)	8 (7.4)	0 (0)
Q25e. Are nuts low in fat?	42 (38.9)	42 (38.9)	22 (20.4)	2 (1.9)
Q25f. Is margarine low in fat?	49 (45.4)	46 (42.6)	11 (10.2)	2 (1.9)
Q25g. Is olive oil low in fat?	54 (50)	30 (27.8)	24 (22.2)	0 (0)
Q25h. Is chocolate low in fat?	103 (95.4)	2 (1.9)	1 (0.9)	2 (1.9)
Q26a. Does steak contain fibre?	65 (60.2)	18 (16.7)	23 (21.3)	2 (1.9)
Q26b. Do baked beans contain fibre?	86 (79.6)	14 (13)	7 (6.5)	1 (0.9)
Q26c. Does apple juice contain fibre?	41 (38)	39 (36.1)	25 (23.1)	3 (2.8)
Q26d. Does bread contain fibre?	95 (88)	7 (6.5)	4 (3.7)	2 (1.9)
Q26e. Does fish contain fibre?	47 (43.5)	38 (35.2)	22 (20.4)	1 (0.9)
Q26f. Do oranges contain fibre?	63 (58.3)	25 (23.1)	18 (16.7)	2 (1.9)

**Table 3- Summary of Coronary Heart Disease Knowledge Questions (Questions 27-50)**

<b>Question</b>	<b>Correct Answer n (%)</b>	<b>Incorrect Answer n (%)</b>	<b>Do Not Know Answer n (%)</b>
<b>27. A person always knows when they have heart disease</b>	<b>93 (86.1)</b>	<b>10 (9.3)</b>	<b>5 (4.6)</b>
<b>28. If you have a family history of heart disease, you are at risk of developing heart disease</b>	<b>96 (88.9)</b>	<b>9 (8.3)</b>	<b>3 (2.8)</b>
<b>29. The older a person is, the greater their risk of having heart disease</b>	<b>54 (50)</b>	<b>47 (43.5)</b>	<b>7 (6.5)</b>
<b>30. Smoking is a risk factor for heart disease</b>	<b>97 (89.8)</b>	<b>5 (4.6)</b>	<b>6 (5.6)</b>
<b>31. A person who stops smoking will lower their risk of developing heart disease</b>	<b>85 (78.7)</b>	<b>14 (13)</b>	<b>9 (8.3)</b>
<b>32. High blood pressure is a risk factor for heart disease</b>	<b>102 (94.4)</b>	<b>1 (0.9)</b>	<b>5 (4.6)</b>
<b>33. Keeping blood pressure under control will reduce a person's risk for developing heart disease</b>	<b>94 (87)</b>	<b>2 (1.9)</b>	<b>12 (11.1)</b>
<b>34. High cholesterol is a risk factor for heart disease</b>	<b>102 (94.4)</b>	<b>1 (0.9)</b>	<b>5 (4.6)</b>
<b>35. Eating fatty foods does not affect blood cholesterol levels</b>	<b>89 (82.4)</b>	<b>3 (2.8)</b>	<b>16 (14.8)</b>
<b>36. If your 'good' cholesterol (HDL) is high you are at risk for heart disease</b>	<b>54 (50)</b>	<b>25 (23.1)</b>	<b>29 (26.9)</b>
<b>37. If your 'bad' cholesterol (LDL) is high you are at risk for heart disease</b>	<b>77 (71.3)</b>	<b>7 (6.5)</b>	<b>24 (22.2)</b>
<b>38. Being overweight increases a person's risk for heart disease</b>	<b>107 (99.1)</b>	<b>0 (0)</b>	<b>1 (0.9)</b>
<b>39. Regular physical activity will lower a person's chance of getting heart disease</b>	<b>103 (95.4)</b>	<b>3 (2.8)</b>	<b>2 (1.9)</b>
<b>40. Only exercising at a gym or in an exercise class will lower a person's chance of developing heart disease</b>	<b>99 (91.7)</b>	<b>9 (8.3)</b>	<b>0 (0)</b>
<b>41. Walking and gardening are considered exercise that will help lower a person's chance of developing heart disease</b>	<b>95 (88)</b>	<b>6 (5.6)</b>	<b>7 (6.5)</b>
<b>42. Diabetes is a risk factor for developing heart disease</b>	<b>75 (69.4)</b>	<b>11 (10.2)</b>	<b>22 (20.4)</b>
<b>43. A person who has Diabetes can reduce their risk of developing heart disease if they keep their blood sugar levels under control</b>	<b>75 (69.4)</b>	<b>10 (9.3)</b>	<b>23 (21.3)</b>
<b>44. People with diabetes rarely have high cholesterol</b>	<b>48 (44.4)</b>	<b>11 (10.2)</b>	<b>49 (45.4)</b>
<b>45. Men with diabetes have a higher risk of heart disease than women with diabetes</b>	<b>34 (31.5)</b>	<b>35 (32.4)</b>	<b>39 (36.1)</b>
<b>46. Heart disease is as dangerous for women as it is for men</b>	<b>87 (80.6)</b>	<b>9 (8.3)</b>	<b>12 (11.1)</b>
<b>47. Everyone who has a heart attack experiences chest pain</b>	<b>53 (49.1)</b>	<b>44 (40.7)</b>	<b>11 (10.2)</b>
<b>48. A person can reduce their chances of dying from heart disease through lifestyle changes</b>	<b>108 (100)</b>	<b>0 (0)</b>	<b>0 (0)</b>
<b>49. Daily aspirin is often recommended to reduce heart disease risk</b>	<b>55 (50.9)</b>	<b>21 (19.4)</b>	<b>32 (29.6)</b>
<b>50. Cholesterol is only found in animal products</b>	<b>12 (11.1)</b>	<b>53 (49.1)</b>	<b>43 (39.8)</b>

### **3.4. Coronary Heart Disease Knowledge Scores Between Student Groups**

The range of the CHD knowledge scores for the students who received the CHD knowledge module as part of their course of study was 24, ranging from a score of 24-48 with a median score of 36 (69%) out of a possible score of 52 (100%) and the range of the CHD knowledge scores for the students who did not receive the CHD knowledge module as part of their course of study was 28, ranging from a score of 19-47 with a median score of 31 (60%) out of a possible score of 52 (100%).

Tables 4 and 5 provide a summary of the questions answered correctly by students who had undertaken a CHD knowledge module compared to students who had not undertaken a CHD knowledge module as part of their course of study. Tables 4 and 5 demonstrate that for the majority of CHD knowledge questions (46/52) a greater number of students who had undertaken the CHD knowledge module answered these questions correctly compared to students who had not undertaken the CHD knowledge module as part of their course of study. There were only six questions where a greater number of students who had not undertaken a CHD knowledge module answered the questions correctly than students who had undertaken a CHD knowledge module as part of their course of study. These questions included; question 26g (54.2% compared to 45%) question 25b (64.6% compared to 53.3%), 26f (64.6% compared to 53.3%), question 29 (56.3% compared to 45%), question 38 (100% compared to 96.7%) and question 41 (91.7% compared to 85%). Therefore indicating that the CHD knowledge score of students who have undertaken a CHD knowledge module may be greater than the CHD knowledge score of students who have not undertaken a CHD knowledge module as part of their course of study.

**Table 4- Summary of Coronary Heart Disease Knowledge Questions by Student Group (Questions 19-26)**

Question	CHD Knowledge Module Correct Answer n (%)	No CHD Knowledge Module Correct Answer n (%)
19. What is Coronary Heart Disease?	43 (71.7)	18 (37.5)
20. What do you think presents the greatest risk of death in men?	52 (86.7)	33 (68.8)
21. What do you think presents the greatest risk of death in women?	28 (46.7)	16 (33.3)
22a. To reduce your blood cholesterol level do you think you should eat less cakes and biscuits?	60 (100)	45 (93.8)
22b. To reduce your blood cholesterol level do you think you should eat less skimmed milk?	50 (83.3)	37 (77.1)
22c. To reduce your blood cholesterol level do you think you should eat less ice cream?	45 (75)	31 (64.6)
22d. To reduce your blood cholesterol level do you think you should eat less fat on meat?	57 (95)	41 (85.4)
22e. To reduce your blood cholesterol level do you think you should eat less sugar?	7 (11.7)	2 (4.2)
22f. To reduce your blood cholesterol level do you think you should eat less bread?	42 (70)	27 (56.3)
22g. To reduce your blood cholesterol level do you think you should eat less peanuts?	27 (45)	26 (54.2)
22h. To reduce your blood cholesterol level do you think you should eat less coconut?	10 (16.7)	4 (8.3)
22i. To reduce your blood cholesterol level do you think you should eat less avocado?	46 (76.7)	36 (75)
Q23. To reduce your cholesterol it is important to eat less; cholesterol or saturated fat?	49 (81.7)	30 (62.5)
Q24. Which has less fat; butter, margarine or they are equal?	9 (15)	6 (12.5)
Q25a. Is museli low in fat?	7 (11.7)	6 (12.5)
Q25b. Is spaghetti low in fat?	32 (53.3)	31 (64.6)
Q25c. Is rice low in fat?	45 (75)	35 (72.9)
Q25d. Is bread low in fat?	38 (63.3)	30 (62.5)
Q25e. Are nuts low in fat?	28 (46.7)	14 (29.2)
Q25f. Is margarine low in fat?	31 (51.7)	18 (37.5)
Q25g. Is olive oil low in fat?	34 (56.7)	20 (41.7)
Q25h. Is chocolate low in fat?	58 (96.7)	45 (93.8)
Q26a. Does steak contain fibre?	42 (70)	23 (47.9)
Q26b. Do baked beans contain fibre?	50 (83.3)	36 (75)
Q26c. Does apple juice contain fibre?	34 (56.7)	7 (14.6)
Q26d. Does bread contain fibre?	52 (86.7)	43 (89.6)
Q26e. Does fish contain fibre?	36 (60)	11 (22.9)
Q26f. Do oranges contain fibre?	32 (53.3)	31 (64.6)



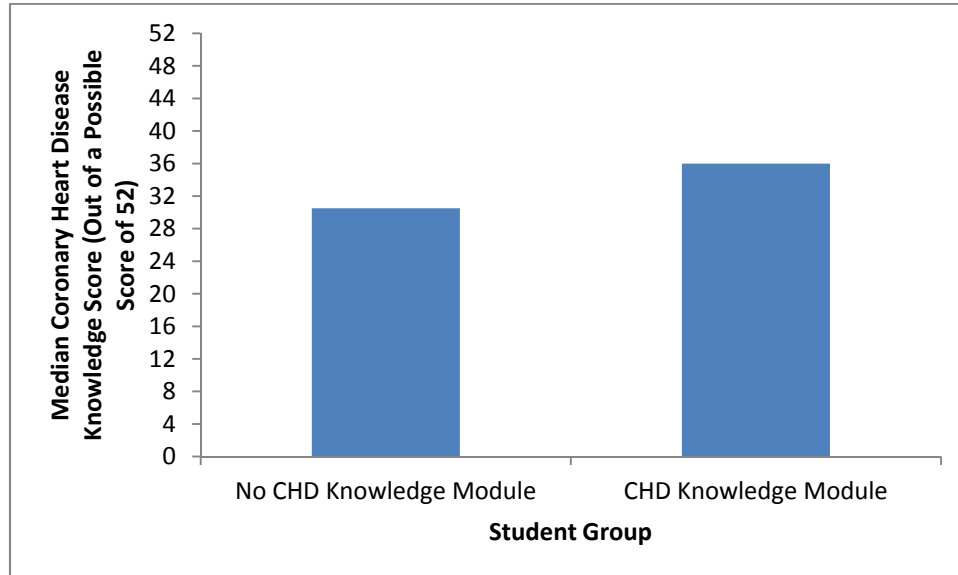
**Table 5- Summary of Coronary Heart Disease Knowledge Questions by Student Group (Questions 27-50)**

<b>Question</b>	<b>CHD Knowledge Module Correct Answer n (%)</b>	<b>No CHD Knowledge Module Correct Answer n (%)</b>
27. A person always knows when they have heart disease	55 (91.7)	38 (79.2)
28. If you have a family history of heart disease, you are at risk of developing heart disease	54 (90)	42 (87.5)
29. The older a person is, the greater their risk of having heart disease	27 (45)	27 (56.3)
30. Smoking is a risk factor for heart disease	57 (95)	40 (83.3)
31. A person who stops smoking will lower their risk of developing heart disease	48 (80)	37 (77.1)
32. High blood pressure is a risk factor for heart disease	59 (98.3)	43 (89.6)
33. Keeping blood pressure under control will reduce a person's risk for developing heart disease	55 (91.7)	39 (81.3)
34. High cholesterol is a risk factor for heart disease	60 (100)	42 (87.5)
35. Eating fatty foods does not affect blood cholesterol levels	55 (91.7)	34 (70.8)
36. If your 'good' cholesterol (HDL) is high you are at risk for heart disease	40 (66.7)	14 (29.2)
37. If your 'bad' cholesterol (LDL) is high you are at risk for heart disease	49 (81.7)	28 (58.3)
38. Being overweight increases a person's risk for heart disease	59 (98.3)	48 (100)
39. Regular physical activity will lower a person's chance of getting heart disease	58 (96.7)	45 (93.8)
40. Only exercising at a gym or in an exercise class will lower a person's chance of developing heart disease	55 (91.7)	44 (91.7)
41. Walking and gardening are considered exercise that will help lower a person's chance of developing heart disease	51 (85)	44 (91.7)
42. Diabetes is a risk factor for developing heart disease	46 (76.7)	29 (60.4)
43. A person who has Diabetes can reduce their risk of developing heart disease if they keep their blood sugar levels under control	45 (75)	30 (62.5)
44. People with diabetes rarely have high cholesterol	33 (55)	15 (31.3)
45. Men with diabetes have a higher risk of heart disease than women with diabetes	25 (41.7)	8 (16.7)
46. Heart disease is as dangerous for women as it is for men	49 (81.7)	38 (79.2)
47. Everyone who has a heart attack experiences chest pain	39 (65)	14 (29.2)
48. A person can reduce their chances of dying from heart disease through lifestyle changes	60 (100)	48 (100)
49. Daily aspirin is often recommended to reduce heart disease risk	33 (55)	22 (45.8)
50. Cholesterol is only found in animal products	7 (11.7)	5 (10.4)

The CHD knowledge scores were analysed to determine if a significant difference in CHD knowledge scores existed between students who had received the CHD knowledge module and students who had not received the CHD knowledge module as part of their course of study. As this data is of ratio level and this study used an independent sample design the statistical test chosen was the Independent Samples T-test. As the Independent Samples T-test is a parametric test it is based on the assumption that this data has normal distribution and homogeneity of variance, failure to meet these assumptions would result in a comparable non-parametric test being selected (Williams & Wragg, 2004).

This study involved 108-subjects therefore the Kolmogorov-Smirnov statistic was consulted to determine if this data was normally distributed (Coakes & Steed, 2007). The Sig. column under the Kolmogorov-Smirnov column stated that  $p=0.047$  (CHD knowledge score out of a possible score of 52 for students who have undertaken a CHD knowledge module) and  $p=2.00$  (CHD knowledge score out of a possible score of 52 for students who have not undertaken a CHD knowledge module) (See Appendix 6). For the CHD knowledge score of students who have not undertaken a CHD knowledge module  $p$  is  $>0.05$ , thus this data has normal distribution however,  $p$  is  $<0.05$  for CHD knowledge score of students who have not undertaken a CHD knowledge module, which violates the assumption of normal distribution. The sig. column in the test of homogeneity stated that  $p=0.534$ , as  $p>0.05$  this data has met the assumption of homogeneity of variance (See Appendix 6) (Conar, 1998). However, as this data failed the assumption of normal distribution the non-parametric Mann Whitney U test was performed to determine if a significant difference in CHD knowledge scores existed between the two student groups. The Asymp. Sig. (2-tailed) column was consulted, which stated that  $p=0.0001$  (See Appendix 6). As  $p<0.05$  this indicates that a significant difference exists between the CHD knowledge score of the student groups.

As this data is of ratio-level and failed the assumption of normal distribution the median and range of 100% of the sample was consulted to determine the direction of this statistically significant difference, which is displayed in figure-1 (Conar, 1998). The median CHD knowledge score for the student group who had received the CHD knowledge module was 36 with a range of 24 (scores ranged from 24-48 out of a possible 52) and the median CHD knowledge score for the student group who did not receive the CHD knowledge module was 31 with a range of 28 (scores ranged from 19-47 out of a possible 52) (See figure-2). Thus, the descriptive statistics indicate that the CHD knowledge scores of students who have undertaken the CHD knowledge module is significantly greater than the CHD knowledge scores of students who have not undertaken the CHD knowledge module as part of their course of study ( $p=0.0001$ ).



**Figure 2- Median Coronary Heart Disease Knowledge Scores Between Students**

### 3.5. Self-Reported Health Behaviours

One-point was awarded for each positive health behaviour reported; these scores were then collated to give students a self-reported health behaviour score out of a possible score of ten. With a higher score indicating a greater number of positive health behaviours (Steptoe & Wardle, 2001). The health behaviour scores of first year female HSC students, as determined by the healthy lifestyle index, had a range of 7, ranging from a score of 2-9 with a median score of 5 (50%) out of a possible score of 10 (100%). Table-6 provides a summary of the self-reported health behaviours of the students, which demonstrates that for six out of the ten health behaviours more students reported positive health behaviours than negative health behaviours. These included; body mass index within healthy index (n=66, 61.1%), non-smokers (n=70, 64.8%), stress levels within current guidelines (n=72, 66.7%), alcohol consumption within current guidelines (n=96, 88.9%), makes a conscious effort to avoid foods high in saturated and trans fats (n=60, 55.6%) and not regularly adding salt to meals at the dinner table (n=60, 55.6%) (See table-5). However, table-6 also demonstrates that for four out of the ten health behaviours more students reported negative health behaviours than positive health behaviours, which included; physical activity levels not meeting current guidelines (n=87, 80.6%), not making a conscious effort to eat foods high in fibre (n=66, 61.1%), daily fruit and vegetable consumption not meeting guidelines (n=88, 81.5%) and adding salt to food when cooking it (n=55, 50.9%).

**Table 6- Summary of Health Behaviour Questions**

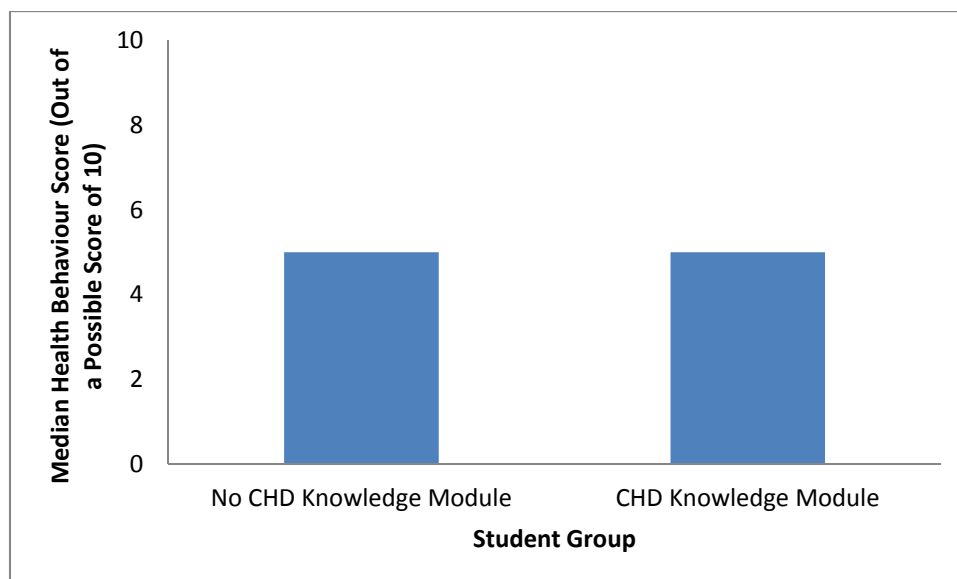
<b>Health Behaviour</b>	<b>Yes n (%)</b>	<b>No n (%)</b>	<b>Do Not Know n (%)</b>	<b>Missing Data n (%)</b>
<b>Body Mass Index Within Healthy Index?</b>	<b>66 (61.1)</b>	<b>36 (33.3)</b>	<b>0 (0)</b>	<b>6 (5.6)</b>
<b>Do You Smoke?</b>	<b>37 (34.3)</b>	<b>70 (64.8)</b>	<b>0 (0)</b>	<b>1 (0.9)</b>
<b>Physical Activity Levels Meeting Current Guidelines?</b>	<b>57 (52.8)</b>	<b>87 (80.6)</b>	<b>0 (0)</b>	<b>4 (3.7)</b>
<b>Stress Levels in the fair to very good range?</b>	<b>72 (66.7)</b>	<b>36 (33.3)</b>	<b>0 (0)</b>	<b>0 (0)</b>
<b>Alcohol Consumption Meeting Current Guidelines</b>	<b>96 (88.9)</b>	<b>12 (11.1)</b>	<b>0 (0)</b>	<b>0 (0)</b>
<b>Do You Make a Conscious Effort to Try and Eat Foods That Are High in Fibre?</b>	<b>41 (38.0)</b>	<b>66 (61.1)</b>	<b>0 (0)</b>	<b>1 (0.9)</b>
<b>Do You Make a Conscious Effort to Try and Avoid Foods High in Saturated and Trans Fats?</b>	<b>60 (55.6)</b>	<b>48 (44.4)</b>	<b>0 (0)</b>	<b>0 (0)</b>
<b>Fruit and Vegetable Consumption Meeting Daily Guidelines</b>	<b>15 (13.9)</b>	<b>88 (81.5)</b>	<b>0 (0)</b>	<b>5 (4.6)</b>
<b>Do you or the person who cooks your meals, regularly add salt to them when they are cooking?</b>	<b>55 (50.9)</b>	<b>46 (42.6)</b>	<b>7 (6.5)</b>	<b>0 (0)</b>
<b>Do you regularly add salt to your meals at the table?</b>	<b>47 (43.5)</b>	<b>60 (55.6)</b>	<b>0 (0)</b>	<b>1 (0.9)</b>

### **3.6. Self-Reported Health Behaviour Scores Between Student Groups**

The self-reported health behaviour scores of students who had undertaken the CHD knowledge module were compared with the scores of the students who had not undertaken the CHD knowledge module as part of their course of study in order to establish if a significant difference in health behaviour scores existed between these two student groups. As this data was of ratio level and this study used an independent sample design the statistical test chosen was the Independent Samples T-test. As the Independent Samples T-test is a parametric test it is based on the assumption that this data has normal distribution and homogeneity of variance, failure to meet these assumptions would result in a comparable non-parametric test being selected (Williams & Wragg, 2004). This study involved 108-subjects therefore the Kolmogorov-Smirnov statistic

was consulted to determine if this data was normally distributed (Coakes & Steed, 2007). The Sig. column under the Kolmogorov-Smirnov column stated that  $p=0.003$  (health behaviour score out of a possible score of ten for students who have undertaken a CHD knowledge module) and  $p=0.016$  (health behaviour score out of a possible score of ten for students who have not undertaken a CHD knowledge module) (See Appendix 7). For the health behaviour score of both student groups  $p$  was  $<0.05$ , which violates the assumption of normal distribution. The sig. column in the test of homogeneity stated that  $p=0.940$ , as  $p>0.05$  this data has met the assumption of homogeneity of variance (See Appendix 7) (Conar, 1998). However, as this data failed the assumption of normal distribution the non-parametric Mann Whitney U test was performed to determine if a significant difference in health behaviour scores existed between the two student groups. The Asymp. Sig. (2-tailed) column was consulted, which stated that  $p=0.742$ . As  $p>0.05$  this indicates that no significant difference exists between the health behaviour score of the students in the no CHD knowledge group and students in the CHD knowledge group (See Appendix 7).

As this data was of ratio-level and failed the assumption of normal distribution the median and range of 100% of the sample was consulted, which is displayed in figure-3 (Conar, 1998). The median health behaviour score for the student group who had received the CHD knowledge module was five with a range of seven (scores ranged from two-nine out of a possible ten) and the median health behaviour score for the student group who did not receive the CHD knowledge module was identical, five with a range of seven (scores ranged from two-nine out of a possible ten) (See figure-3). Thus, the descriptive statistics support the results of the Mann-Whitney U Test, that there is no statistically significant difference in the health behaviour scores of students who have undertaken the CHD knowledge module compared to the students who have not undertaken the CHD knowledge module as part of their course of study ( $p=0.742$ ).

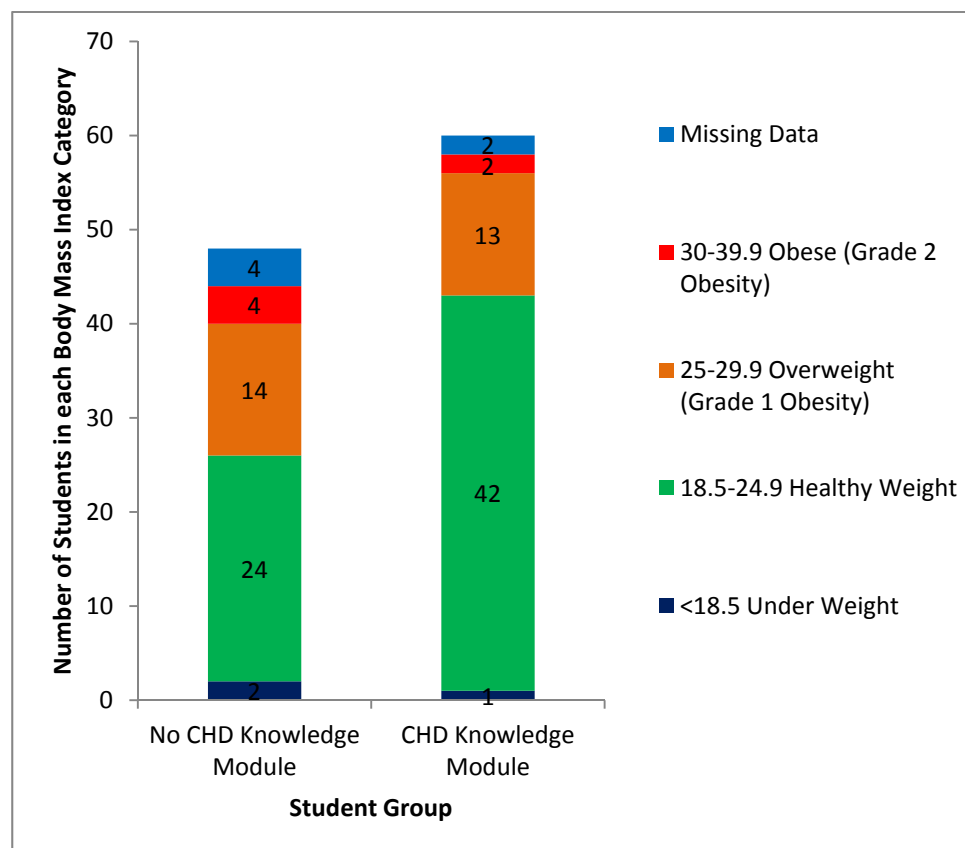


**Figure 3- Median Health Behaviour Score Between Students**

### **3.6.1. Diet/Weight Management**

Figure-4 provides details of the number of students (who had either undertaken the CHD knowledge module or who had not undertaken the CHD knowledge module as part of their course of study) in each body mass index category as calculated using student's self-reported height (metres) and weight (kilograms) measurements. Figure-4 indicates that the CHD knowledge module group had one-student (1.7%) in the underweight category, 42-students (70.0%) in the healthy weight category, 13-students (21.7%) in the overweight category and two-students (3.3%) in the obese category and the no CHD knowledge module group had two-students (4.2%) in the underweight category, 24-students (50.0%) in the healthy weight category, 14-students (29.2%) in the overweight category and four-students (8.3%) in the obese category. Indicating that a greater number of students who had undertaken the CHD knowledge module had a BMI within the healthy weight category (n=42, 70.0%) than that of students who had not undertaken the CHD knowledge module (n=24, 50.0%), which suggests that students who have undertaken a CHD knowledge module may elicit more positive health behaviours with regards to weight management than students who have

not undertaken a CHD knowledge module as part of their course of study (See figure-4). However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant ( $p=0.094$ ) (Conar, 1998).

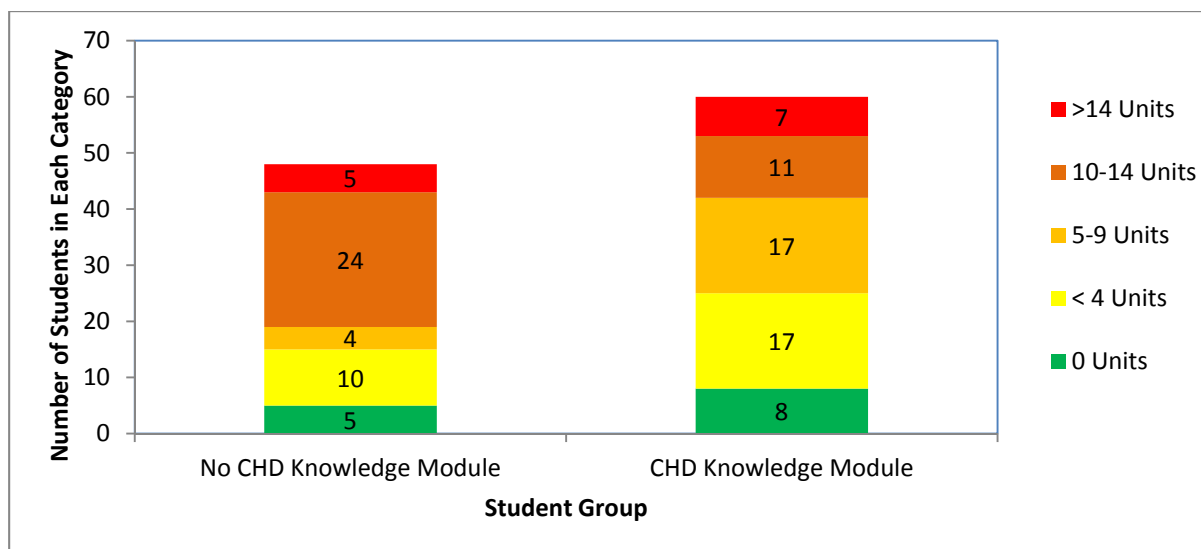


**Figure 4- Body Mass Index of Students (By Category)**

Average weekly alcohol consumption of students who had undertaken a CHD knowledge module compared to students who had not undertaken a CHD knowledge module as part of their course of study is displayed in figure-5. In the no CHD knowledge module group five-students (10.4%) reported consuming zero units of alcohol, ten-students (20.8%) reported consuming less than four units per week, four-students (8.3%) reported consuming five-nine units per week, 24-students (50.0%) reported consuming ten to fourteen units and five-students (10.4%) reported

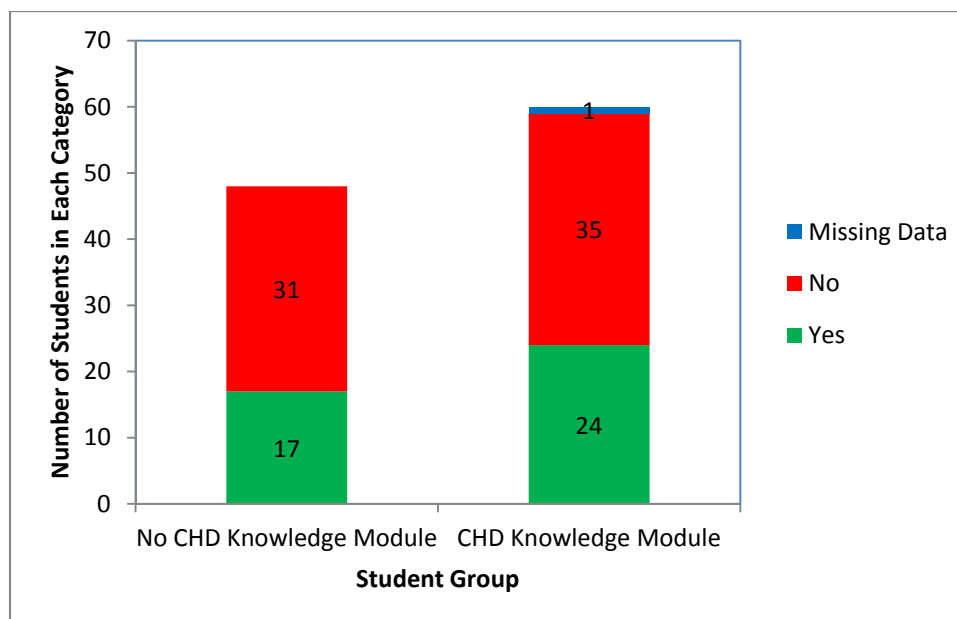


consuming greater than 14 units per week from the no CHD knowledge module group. In the CHD knowledge module group eight-students (13.3%) reported consuming zero units per week, 17-students (28.3%) reported consuming less than four units per week, 17-students (28.3%) reported consuming five-nine units, 11-students (18.3%) reported consuming ten to fourteen units and seven-students (11.7%) reported consuming greater than 14 units per week. Thus, students from the no CHD knowledge module group tended to drink more units of alcohol per week than students from the CHD knowledge module group, with the exception of the greater than 14 units category. Only 5 (10.4%) of the students who had not undertaken the CHD knowledge module and 7 (11.7%) of the students who had undertaken the CHD knowledge module recorded average weekly consumptions of alcohol greater than the recommended guideline of no greater than 14-units of alcohol per week (The Health Survey for Scotland, 2010). Thus, suggesting that the alcohol consumption levels of students who have undertaken a CHD knowledge module tend to be lower than that of students who have not undertaken a CHD knowledge module as part of their course of study, with little difference in the number of students from both groups who reported consuming more than the recommended weekly consumption of alcohol (See figure-5). However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant ( $p=0.868$ ) (Conar, 1998).



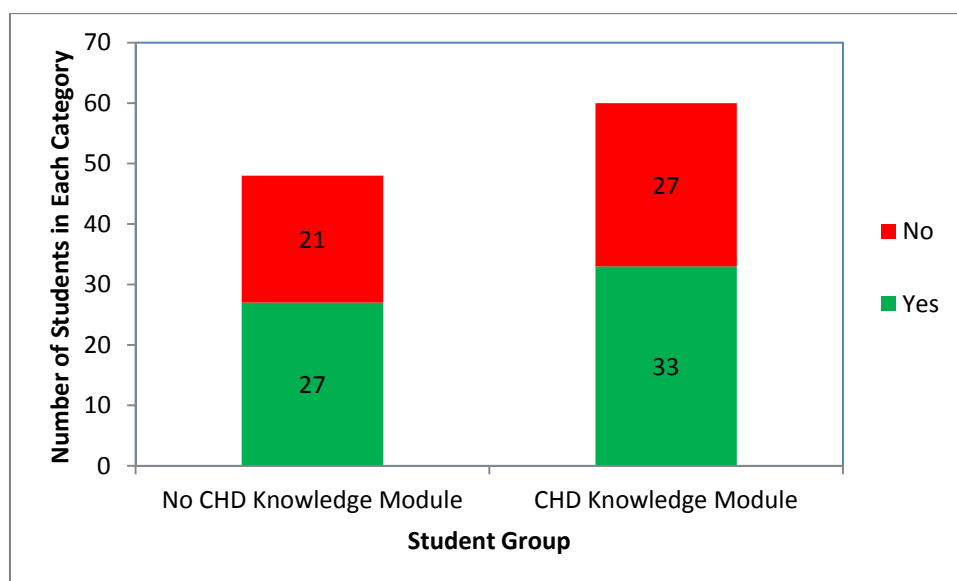
**Figure 5- Average Weekly Alcohol Consumption (Units of Alcohol) of Students**

Figure-6 displays details of the number of students (who had undertaken a CHD knowledge module or who had not undertaken a CHD knowledge module as part of their course of study) who reported making a conscious effort to try and eat foods that are high in fibre. Figure-6 demonstrates that in both student groups a greater number of students reported not making a conscious effort to eat foods high in fibre; no CHD knowledge module group (n=31, 64.6%) and CHD knowledge module group (n=35, 58.3%). With the number of students who reported making a conscious effort to eat foods high in fibre being similar in the group of students who had not undertaken a CHD knowledge module (n=17, 35.4%) and the group of students who had undertaken the CHD knowledge module (n=24, 40.0%) (See figure-6). Thus, suggesting that there is no difference in the fibre consumption behaviour of students who had undertaken a CHD knowledge module and students who had not undertaken a CHD knowledge module as part of their course of study. However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant (p=0.773) (Conar, 1998).



**Figure 6- Number of Students Who Make A Conscious Effort to Eat Foods High in Fibre**

Figure-7 reports the number of students (who had undertaken a CHD knowledge module or who had not undertaken a CHD knowledge module as part of their course of study) who reported making a conscious effort to try and avoid foods that are high in saturated and trans fats. Figure-7 illustrates that for both student groups a greater number of students reported making a conscious effort to try and avoid foods high in saturated and trans fats; no CHD knowledge module group ( $n=27$ , 56.3%) and CHD knowledge module group ( $n=33$ , 55%). With 21-students (43.8%) from the no CHD knowledge module group and 27-students (45.0%) from the CHD-knowledge module group reporting not making a conscious effort to try and avoid foods high in saturated and trans fats. Therefore, both groups had similar numbers of students reporting that they make a conscious effort to avoid foods high in saturated and trans fats, which suggests that there is no difference in saturated and trans fat consumption behaviours of students who had undertaken a CHD knowledge module compared to students who had not undertaken a CHD knowledge module as part of their course of study. However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant ( $p=0.974$ ) (Conar, 1998).

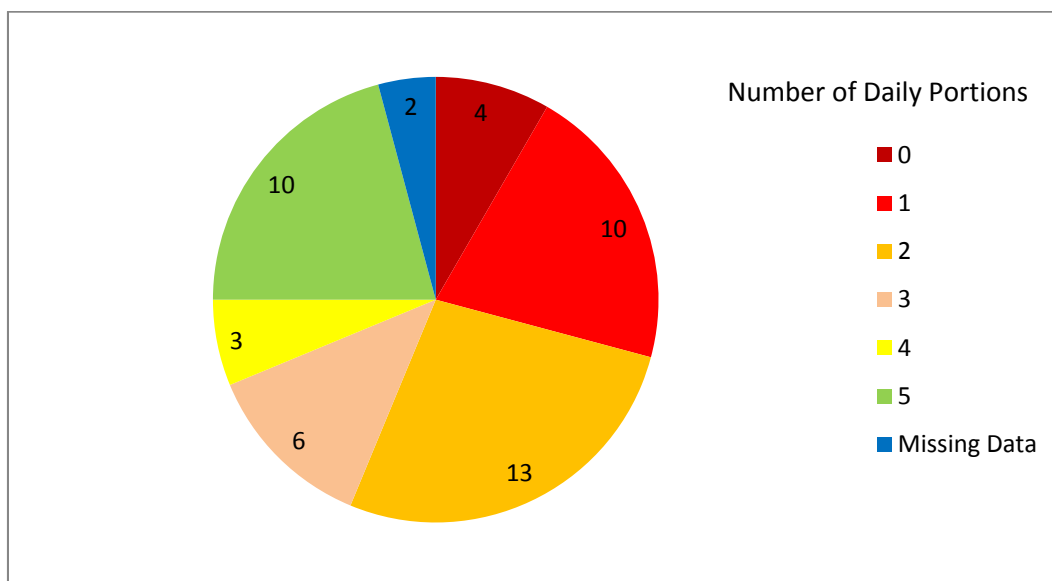


**Figure 7- Number of Students Who Make a Conscious Effort to Try and Avoid Foods High in Saturated and Trans Fats**

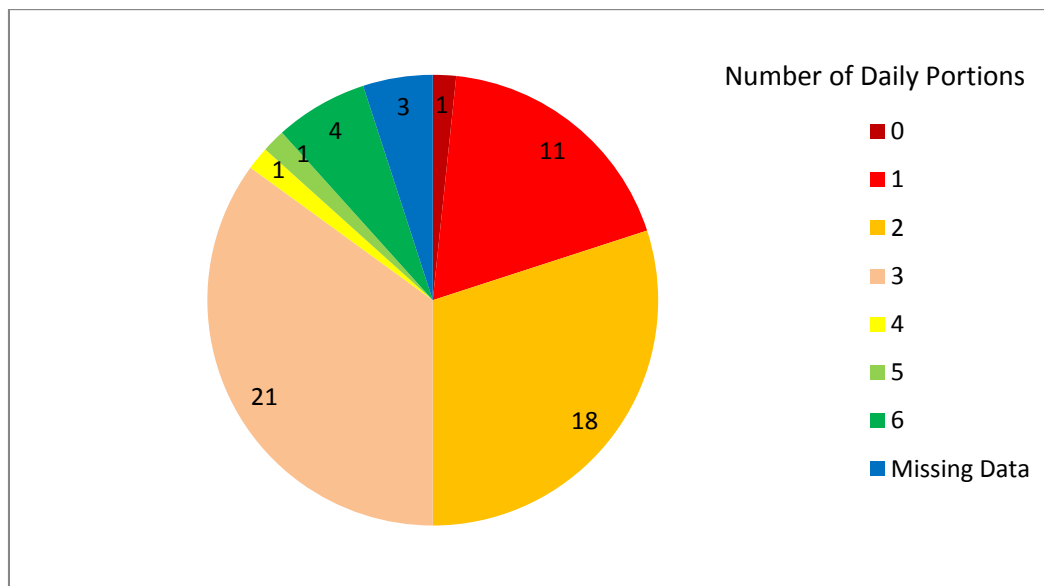
Figure-8 displays the average number of fruit and vegetables consumed per day by students who had not undertaken a CHD knowledge module. This figure states that four-students consumed zero portions, ten-students (20.8%) consumed one portion, 13-students (27.1%) consumed two portions, six-students (12.5%) consumed three portions, three-students (6.3%) consumed four portions and ten-students (20.8%) consumed five portions, which demonstrates that only ten-students (20.8%) in this group are meeting the recommended daily intake of fruit and vegetables of five or more portions to be consumed per day (World Health Organisation (WHO), 1991). Indicating that a large proportion of this student group (n=36, 75.0%) are not currently meeting the recommended daily fruit and vegetable intake.

Figure-9 displays the average number of fruit and vegetables consumed per day by students who had undertaken a CHD knowledge module. This figure states that one-student (1.7%) consumed zero portions, 11-students (18.3%) consumed one portion, 18-students (30.0%) consumed two portions, 21-students (35.0%) consumed three portions, one-student (1.7%) consumed four portions, one-student (1.7%) consumed five portions and four-students (6.7%) consumed six

portions, which demonstrates that only five students (8.3%) in this group are meeting the recommended daily intake of fruit and vegetables of five or more portions to be consumed per day (World Health Organisation (WHO), 2003). Again, indicating that a large proportion of this student group (n=52, 86.7%) are not currently meeting the recommended daily fruit and vegetable intake. In addition to this these findings also suggest that students who had not received the CHD knowledge module were more likely to consume the recommended daily intake of fruit and vegetables (n=10, 20.8%) than students who had received the CHD knowledge module (n=5, 8.3%) (See figures six and seven). However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant ( $p=0.854$ ) (Conar, 1998).

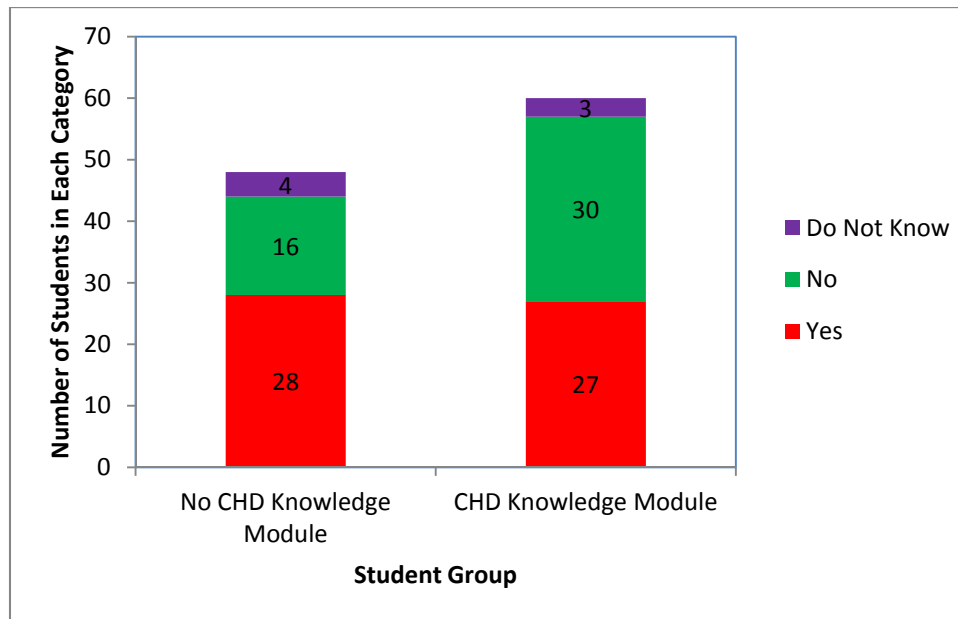


**Figure 8- Average Number of Portions of Fruit and Vegetables Consumed Per Day by Students Who Had Not Undertaken a Coronary Heart Disease Knowledge Module**



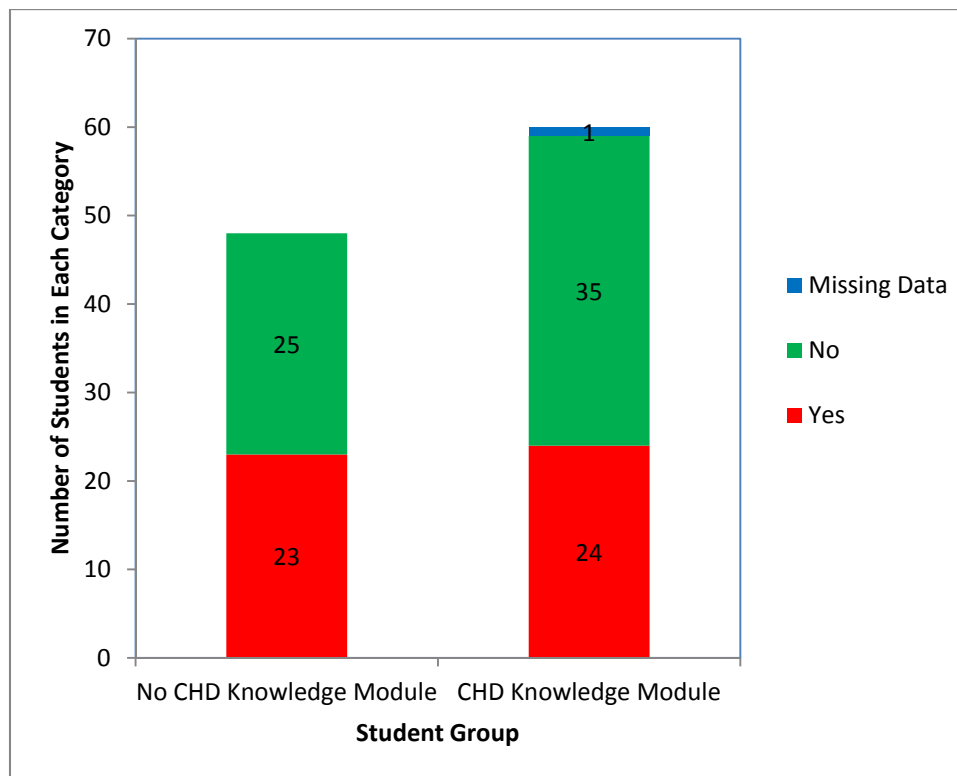
**Figure 9- Average Number of Portions of Fruit and Vegetables Consumed Per Day by Students Who Have Undertaken a Coronary Heart Disease Knowledge Module**

Figure-10 provides details of the number of students (who had undertaken a CHD knowledge module or who had not undertaken a CHD knowledge module as part of their course of study) who recorded adding salt to their meals whilst cooking them. Figure-10 shows that 28-students (58.3%) from the no CHD knowledge module group and 27-students (50.0%) from the CHD knowledge module group reported adding salt to their meals whilst cooking them and 16-students (33.3%) from the no CHD knowledge module group and 30-students (50.0%) from the CHD knowledge module group reported not adding salt to their meals when cooking them. Therefore, suggesting that students who had received the CHD knowledge module were more likely to not add salt to their meals, when cooking them, than students who had not received the CHD knowledge module. However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant ( $p=0.235$ ) (Conar, 1998).



**Figure 10- Number of Students Who Reported Adding Salt to Their Meals Whilst Cooking Them**

Figure-11 provides details of the number of students (who had undertaken a CHD knowledge module or who had not undertaken a CHD knowledge module as part of their course of study) who recorded regularly adding salt to their meals at the table. Figure-11 shows that similar numbers of students from both student groups reported regularly adding salt to their meals at the table; no CHD knowledge module group (n=23, 47.9%) and CHD knowledge module group (n=24, 40.0%). With similar numbers of students from both student groups reporting not regularly adding salt to their meals at the table; no CHD knowledge module group (n=25, 52.1%) and CHD knowledge module group (n=35, 58.3%). With further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) identifying no significant difference between these student groups ( $p=0.316$ ) (Conar, 1998). Indicating that there is no difference in students salt consumption behaviours between students who have received a CHD knowledge module and students who have not received a CHD knowledge module.

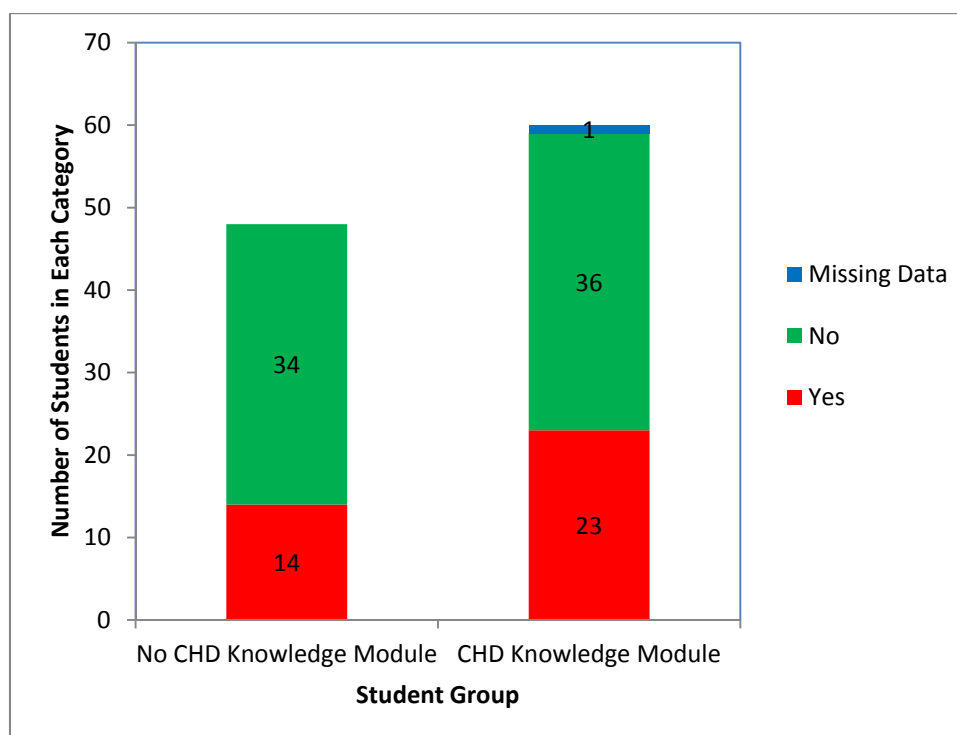


**Figure 11- Number of Students Who Reported Adding Salt to Their Meals at the Table**

### 3.6.2. Smoking

Figure-12 shows the smoking status of students who had undertaken a CHD knowledge module and students who had not undertaken a CHD knowledge module as part of their course of study. Figure-12 indicates that a greater number of students from the CHD knowledge module group ( $n=23$ , 38.3%) reported being smokers than students from the no CHD knowledge module group ( $n=14$ , 29.2%). With 34-students (70.8%) from the no CHD knowledge module and 36-students (60.0%) from the CHD knowledge module group reporting being non-smokers, which suggests that students who received the CHD knowledge module had poorer smoking behaviours than students who had not received the CHD knowledge module. However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant ( $p=0.310$ ) (Conar, 1998).



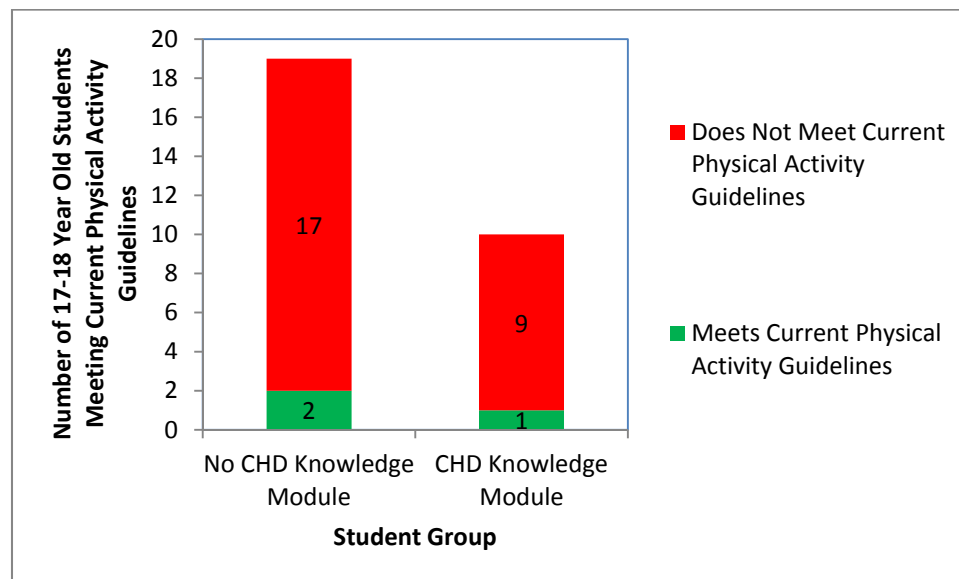


**Figure 12- Self-Reported Smoking Status of Students**

### **3.6.3. Physical Activity/Exercise**

Figure-13 reports the number of 17-18 year olds in this student population currently meeting the physical activity recommendations of one hour a day for young people (5-18 year olds) living in Scotland (Chief Medical Office (CMO), 2011). Figure-13 demonstrates that a large percentage of this student population are not meeting current physical activity recommendations of one-hour of physical activity per day (CMO, 2011), with 17-students (89.5%) from the no CHD knowledge module group (aged 17-18 years old) not meeting the current physical activity recommendations and 9-students (90.0%) from the CHD knowledge module group (aged 17-18 years old) not meeting current physical activity recommendations (See figure-13). With only one-student (10.0%) from the CHD knowledge module group (17-18 years old) and two-students (10.5%) from the no CHD knowledge module group (17-18 years old) meeting current physical activity recommendations. Indicating that the physical activity behaviours of this student population was

poor with similar numbers of students who had received the CHD knowledge module displaying poor physical activity behaviours as students who had not received the CHD knowledge module. However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant ( $p=0.982$ ) (Conar, 1998).

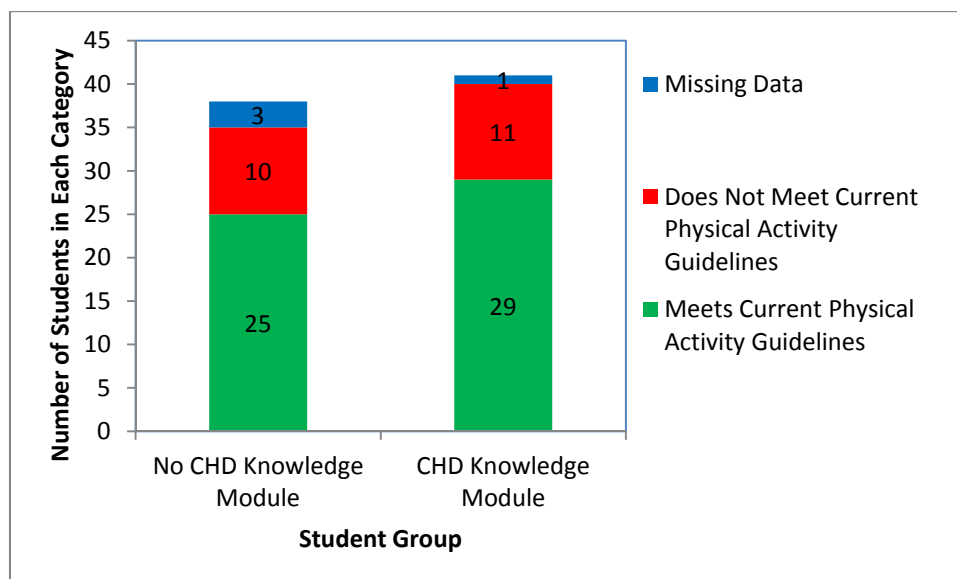


**Figure 13- Number of 17-18 Year Old Students (Young People) Meeting Current Physical Activity Guidelines**

Figure-14 reports the number of 19-54 year olds in this student population currently meeting the physical activity recommendations of 150 minutes moderate physical activity or 75 minutes vigorous physical activity or a combination of both for adults (19-64 year olds) living in Scotland (CMO, 2011). Figure-14 again demonstrates that a substantial percentage of this student population are not meeting current physical activity recommendations, with 10-students (26.3%) from the no CHD knowledge module group (aged 19-54 years old) not meeting the current physical activity recommendations and 11-students (26.8%) from the CHD knowledge module group (aged 19-54 years old) not meeting current physical activity recommendations (See figure-14). However,

unlike the 17-18 year old student population the 19-54 year old student population had a greater number of students meeting current physical activity recommendations, possibly due to the reduced recommended levels of physical activity in the adult population (19-64 year olds). With 25-students (65.8%) aged 19-54 from the no CHD knowledge module group meeting current physical activity recommendations and 29-students (70.7) aged 19-54 from the CHD knowledge module group meeting current physical activity recommendations.

These results indicate that the physical activity behaviours of this student population (19-54 year olds) was again sub-optimal with over a quarter of students from both student groups not meeting current physical activity recommendations. However, there was a greater percentage of students meeting the current physical activity recommendations in the 19-64 year old student population (n=54, 68.4%) than the 17-18 year old student population (n=3, 10.3%) with similar numbers of students who had received the CHD knowledge module (n=29, 70.7%) displaying positive physical activity behaviours that meet current recommendations as students who had not received the CHD knowledge module (n=25, 65.8%), which suggests that there was little difference in the physical activity behaviours of students who received the CHD knowledge module and Students who did not receive the CHD knowledge module. With further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) indicating no significant difference ( $p=0.918$ ) (Conar, 1998).

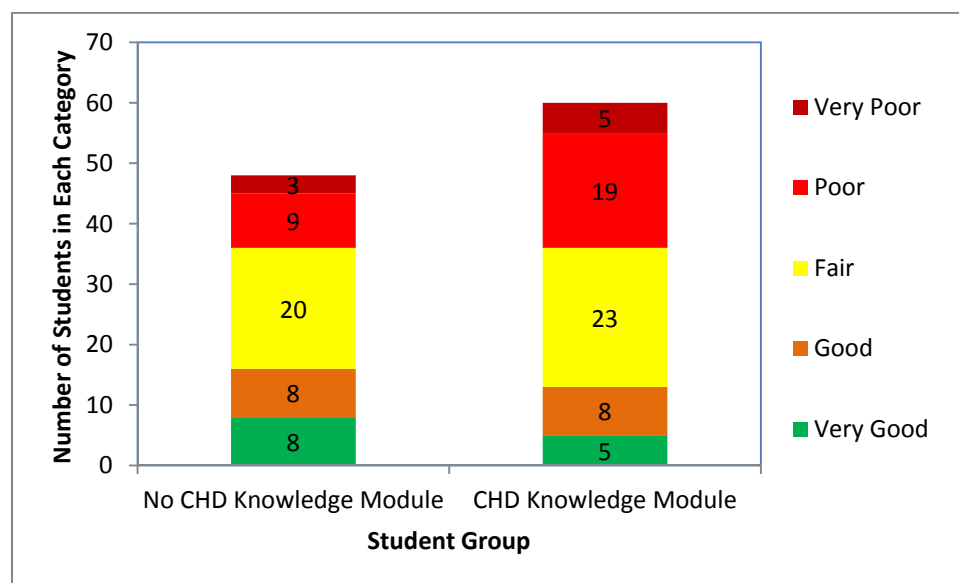


**Figure 14- Number of 19+ Year Old Students (Adults) Meeting Current Physical Activity Guidelines**

#### 3.6.4. Stress Levels

Figure-15 displays details of the self-reported stress levels of students from the no CHD knowledge module group compared to the self-reported stress levels of students from the CHD knowledge module group. Figure-15 demonstrates that eight-students (16.7%) reported very good stress levels, eight-students (16.7%) reported good stress levels, 20-students (41.7%) reported fair stress levels, nine-students (18.8%) reported poor stress levels and three-students (6.3%) reported very poor stress levels from the no CHD knowledge module group. Five-students (8.3%) reported very good stress levels, eight-students (13.3%) reported good stress levels, 23-students (38.3%) reported fair stress levels, 19-students (31.7%) reported poor stress levels and five-students (8.3%) reported very poor stress levels from the CHD knowledge module group. These results indicate that a greater number of students from the no CHD knowledge module group (n=36, 75.0%) and CHD knowledge module group (n=36, 60.0%) reported having stress levels in the fair to very good range than the poor or very poor range. With only 12-students (25.0%) from the no CHD knowledge module group and 24-students (40.0%) from the CHD knowledge module group reporting stress

levels in the poor to very poor range. These results suggest that the majority of students from both groups had fair to very good stress levels (n=72, 66.7%), with slightly more students from the CHD knowledge group (n=24, 40.0%) reporting poor to very poor stress levels than students from the no CHD knowledge group (n=24, 40.0%) reporting poor to very poor stress levels than students from the no CHD knowledge module group (n=12, 25.0%). Therefore, suggesting that the stress management behaviours of both student groups were for most of the students positive, with students who had not undertaken the CHD knowledge module possibly possessing slightly better stress management behaviours than students who had undertaken the CHD knowledge module. However, on further analysis using the Mann Whitney U Test (ratio level data, failed normal distribution) this difference was not significant (p=0.094) (Conar, 1998).

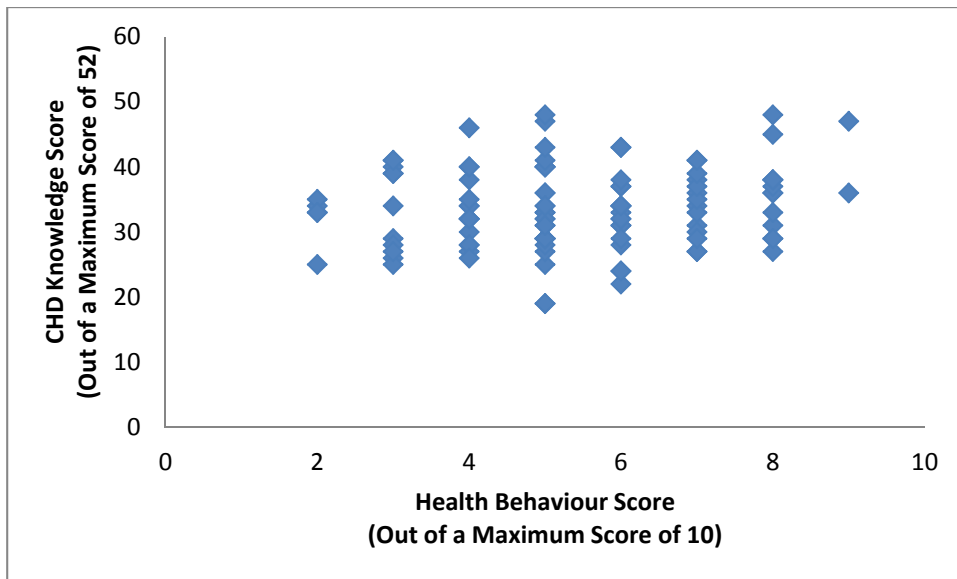


**Figure 15- Stress Levels of Students by Category**

### 3.7. The Relationship Between CHD Knowledge Scores and Health Behaviour Scores

This data was then analysed to determine if an association/relationship exists between students CHD knowledge scores and their positive health behaviour scores. As this data was of ratio-level and this study was concerned with the relationship/correlation between two-variables the Pearson's correlation was the statistical test chosen (Hicks, 1995). The Pearson's correlation is a parametric test, based on the assumption of normal distribution, failure to meet this assumption would result in a comparable non-parametric test being selected (Williams & Wragg, 2004). This study involved 108-subjects therefore the Kolmogorov-Smirnov statistic was consulted to determine if this data was normally distributed (Coakes & Steed, 2007). The Sig. column under the Kolmogorov-Smirnov column stated that  $p=0.0001$  (health behaviour score out of a possible score of ten) and  $p=0.057$  (CHD knowledge score out of a possible score of 52) (See Appendix 8). For CHD knowledge score  $p>0.05$  indicating that this data is normally distributed, however for the health behaviour score  $p$  was  $<0.05$ , which violates the assumption of normal distribution. Subsequently the non-parametric Spearman's Rho was performed to determine if a relationship/correlation existed between students CHD knowledge score (out of a possible score of 52) and self-reported health behaviour scores (out of a possible score of 10). The Sig. (2-tailed) column was consulted, which stated that  $p=0.185$  (See Appendix 8). As  $p>0.05$  this indicates that no significant relationship/correlation exists between the CHD knowledge scores (out of a possible score of 52) and self-reported health behaviour scores (out of a possible score of ten) of this student population.

Figure-16 is a scatter graph, which shows the uncorrelated plots of students self-reported health behaviour scores (out of a possible score of ten) and CHD knowledge scores (out of a possible score of 52), thus supporting the results of the Spearman's Rho analysis that no relationship/correlation exists between students CHD knowledge score (out of a possible score of 52) and self-reported health behaviour scores (out of a possible score of ten).



**Figure 16- The Relationship Between Coronary Heart Disease Knowledge and Self-Reported Health Behaviours in Health and Social Care Students**

# **CHAPTER 4**

## **DISSCUSSION**



## **Chapter 4: Discussion**

### **4.1. Introduction to Discussion**

The purpose of the discussion chapter is to interpret and evaluate the results of the present study and compare these results to those of similar studies in this area. By focusing on the aims and hypotheses of the study, identifying the CHD knowledge and health behaviour scores of students from both study groups, comparing these scores to determine if any difference exists in CHD knowledge scores or health behaviour scores between students who had undertaken a CHD knowledge module and students who had not undertaken a CHH knowledge module as part of their course of study and identifying if any relationship exists between the CHD knowledge score of the students and the health behaviour scores of the students.

### **4.2. Summary of Main Findings**

The results of this study found that the range of CHD knowledge scores of first year female HSC (FE) College students attending South Lanarkshire College was 29, ranging from a score of 19-48, with a median score of 34 (65%) out of a possible score of 52 (100%). The CHD knowledge scores of students who had received the CHD knowledge module as part of their course of study were then compared with the CHD knowledge scores of students who had not received the CHD knowledge module as part of their course of study. Statistical analysis using the Mann Whitney U Test revealed that a significant difference did exist between the CHD knowledge scores of students who had received the CHD knowledge module and students who had not received the CHD knowledge module ( $p=0.0001$ ). As this data was of ratio-level and had failed the assumption of normal distribution the median and range of 100% of the sample was consulted to determine the direction of this statistically significant difference (Conar, 1998). The median CHD knowledge score for the student group who had received the CHD knowledge module was 36

with a range of 24 (scores ranged from 24-48 out of a possible 52) and the median CHD knowledge score for the student group who did not receive the CHD knowledge module was 30.5 with a range of 28 (scores ranged from 19-47 out of a possible 52). Thus, the descriptive statistics indicated that the CHD knowledge scores of students who had undertaken the CHD knowledge module was significantly greater than the CHD knowledge scores of students who had not undertaken the CHD knowledge module as part of their course of study ( $p=0.0001$ ). Therefore, the experimental hypothesis, which states that students who have undertaken a CHD knowledge module as part of their course of study will have had greater education in this subject, thus they will demonstrate greater levels of CHD knowledge than students who have not undertaken a CHD knowledge module as part of their course of study cannot be rejected. The null hypothesis, which states that students who have undertaken a CHD knowledge module as part of their course of study will not demonstrate greater levels of CHD knowledge than students who have not undertaken a CHD knowledge module as part of their course of study can be rejected.

The health behaviour scores of first year female HSC (FE) College students attending South Lanarkshire College., as determined by the healthy lifestyle index, had a range of 7, ranging from a score of 2-9 with a median score of 5 (50%) out of a possible score of 10 (100%). The self-reported health behaviour scores of students who had received the CHD knowledge module were then compared with the scores of students who had not received the CHD knowledge module. Statistical Analysis using the Mann Whitney U Test revealed that no statistically significant difference existed between the self-reported health behaviour scores of students who had received the CHD knowledge module and students who had not received the CHD knowledge module ( $p=0.742$ ). As this data was of ratio-level and had failed the assumption of normal distribution the median and range of 100% of the sample was consulted (Conar, 1998), which stated that the median health behaviour score for the student group who had received the CHD knowledge module and for the student group who did not receive the CHD

knowledge module was identical, 5 with a range of 7 (scores ranged from 2 to 9 out of a possible 10). Thus, supporting the results of the Mann-Whitney U Test, that there is no statistically significant difference in the health behaviour scores of students who have undertaken the CHD knowledge module compared to the students who have not undertaken the CHD knowledge module as part of their course of study ( $p=0.742$ ). Therefore the experimental hypothesis, which states that students who have undertaken a CHD knowledge module as part of their course of study will demonstrate more positive health behaviours than students who have not undertaken a CHD knowledge module as part of their course of study can be rejected. The null hypothesis, which states that students who have undertaken a CHD knowledge module as part of their course of study will not demonstrate more positive health behaviours than students who have not undertaken a CHD knowledge module as part of their course of study cannot be rejected.

The possible association/relationship between the HSC students CHD knowledge scores and self-reported health behaviour scores was then explored using the Spearman's Rho analysis. This analysis revealed that no association/relationship existed between HSC students CHD knowledge scores and self-reported health behaviour score ( $p=0.185$ ). Therefore, the experimental hypothesis, which states that a positive relationship exists between CHD knowledge and positive self-reported health behaviours in first year (FE) female college students can be rejected. The null hypothesis, which states that no relationship exists between CHD knowledge and positive self-reported health behaviours in first year (FE) female college students cannot be rejected.

### 4.3. Coronary Heart Disease Knowledge Between Students

The results of this study found that students who received the CHD knowledge module possessed significantly greater CHD knowledge scores than students who did not receive the CHD knowledge module as part of their course of study ( $p=0.0001$ ). Therefore, the results of this study provide support for the theory that educational interventions may be effective at increasing CHD knowledge (Sharifirad et al. 2009). These results are supported by a study by Pregler et al. (2009), which investigated the effect of a single CHD educational intervention, which lasted one-hour and was based on the AHA (2004) guidelines for cardiovascular disease prevention in women, had on the CHD knowledge levels of 1285 healthcare professionals. This study identified significant improvements in CHD knowledge following completion of the CHD educational intervention, with healthcare professionals on average answering 6.8 out of a possible 8 CHD knowledge questions correctly post-test compared to pre-test results of an average 5.1 out of a possible 8 CHD knowledge questions answered correctly, with significant improvements in the knowledge deficits for all questions ( $p<0.001$ ), thus supporting the role of CHD educational interventions in increasing individuals levels of CHD knowledge (Pregler et al. 2009).

These results are also supported by a study by Sharifirad et al (2009), which identified that just two 80-minute nutrition based educational sessions significantly increased nutritional knowledge in the intervention group (mean difference (MD) from baseline to follow-up  $22.68 \pm 15.90$ ,  $p<0.001$ ) compared to the control group (MD  $-2.27 \pm 17.30$ ,  $p<0.001$ ), suggesting that nutritional based education interventions are effective at increasing nutritional knowledge in individuals with diabetes mellitus (Sharifirad et al. 2009). However, as the two student groups in the present were not randomised but were predetermined by the students chosen course of study, the students who received the CHD knowledge module may have had a preordained interest in health and CHD, which is why they chose their course of study, which may explain the increased CHD knowledge of these students compared to the students of the care and social care courses. A study

by Jones (2010) identified that in a group of students who had not received any CHD education, science-based students had significantly higher CHD knowledge scores than art-based students ( $p < 0.05$ ), suggesting that factors other than CHD education may affect CHD knowledge of students. Thus advocating the need for future studies in this area to apply sufficient participant randomisation methods, which ensure that any changes in CHD knowledge can only be attributable to the educational intervention itself.

In addition to this, as the study by Sharifirad et al. (2009) had a short follow-up period of only one-month and the study by Pregler et al. (2009) and the present study had no follow-up period it is unclear whether these gains in CHD knowledge were short-term or long-term. With some studies in this area suggesting that the proposed benefits and increased patient knowledge that occurs with educational interventions are diminished with time and may only be short-term (Van Dulmen, Sluijs, Van Dijk, De Ridder, Heerdink & Bensing, 2007 & Van Der Veen et al. 2002). Therefore, advocating the need for more longitudinal studies in this area, before any clear conclusions can be drawn (Pregler et al. 2009).

All students in this study correctly identified that a person can reduce their chances of dying from heart disease through lifestyle changes ( $n=108$ , 100%), and most questions about CHD risk factors were answered correctly, suggesting that the majority of students in this study were aware of what behaviours increase an individual's risk of CHD and what behaviours reduce an individual's risk of CHD. However, similar to previous studies in this area (Thanavaro et al. 2006 & Crouch & Wilson, 2010), the results of this study suggest that women underestimate their risk of CHD ( $n=44$ , 40.7% correctly identified CHD as the greatest risk to women) and perceive breast cancer to be their greatest risk ( $n=59$ , 54.6% incorrectly identified breast cancer as the greatest risk to women). This is possibly due to the increased health promotion campaigns by cancer research charities (Thanavaro et al. 2006) advocating the need for greater emphasis on health promotion campaigns and interventions aimed at increasing the CHD knowledge and awareness of females at risk of CHD.

#### **4.4. Self-Reported Health Behaviours Between Students**

The results of this study indicated that there was no significant difference in the health behaviour scores of students who had received the CHD knowledge module compared to students who did not receive the CHD knowledge module ( $p=0.742$ ). Therefore suggesting that although the implementation of a CHD knowledge module aimed at increasing students CHD knowledge was shown to significantly increase students CHD knowledge levels ( $p<0.0001$ ), this increase in CHD knowledge had no effect on student's positive health behaviours, which supports the theory that CHD knowledge alone may not necessarily predict positive health behaviour change (Buckley, 2011).

These results are supported by the findings of a study by Raupach et al. (2009), which investigated the level of student knowledge about smoking, health and smoking cessation methods and smoking behaviours amongst medical students attending a university in London ( $n=656$  students) and Gottingen ( $n=1435$  students) who had been educated about the numerous dangers associated with smoking as part of their degree. This study identified that in Gottingen 25.1% of male medical students and 20.6% of female medical students were self-reported smokers and in London 10.9% of male medical students and 9.1% of female medical students were self-reported smokers, suggesting that educational interventions alone may not be effective at promoting positive health behaviours (Raupach et al. 2009).

However, in contrast to the presents study, this study also identified that students in both universities lacked sufficient levels of knowledge about smoking, health and smoking cessation methods, despite receiving educational inputs as part of their degree (Raupach et al. 2009). This may be explained by poor teaching methods or the proposed theory that any benefits or increased knowledge that occur with educational interventions are only short-term and diminish over time (Van Dulmen, Sluijs, Van Dijk, De Ridder, Heerdink & Bensing, 2007 & Van Der Veen et al. 2002). As student knowledge of smoking, health and smoking cessation methods was generally poor, it is

possible that this lack of knowledge may explain why so many medical students smoke (Raupach et al. 2009). However, students knowledge of smoking-attributable morbidity and mortality was found to be relatively accurate in this study and 60% of the students who smoked stated that they wanted to stop smoking, with a similar proportion of students stating that they had already tried to quit smoking, which suggests that a high percentage of students who smoked were aware of the dangers associated with smoking and were wanting to quit smoking but had failed to achieve this behaviour change (Raupach et al. 2009). Thus, reiterating the theory that educational interventions alone may not be the most effective intervention to promote behaviour change and other interventions may be required to aid behavioural change (Raupach et al. 2009).

On further analysis of the difference in individual health behaviours between students who had received the CHD knowledge module and students who had not received the CHD knowledge module no significant difference was identified between any of the health behaviours, which again suggests that CHD education and increased CHD knowledge has no effect on health behaviours. However, although not significant there were some differences in the individual health behaviours of students who received the CHD knowledge module compared to students who did not receive the CHD knowledge module. With a greater number of students who had undertaken the CHD knowledge module having a BMI within the healthy weight category (n=42, 70.0%) than that of students who had not undertaken the CHD knowledge module (n=24, 50.0%) (p=0.525); a greater number of students from the CHD knowledge module group reported not adding salt to their meals when cooking them (n=30, 50.0%) than that of students who had not undertaken the CHD knowledge module (n=16, 33.3%) (p=0.235); and students who did not receive the CHD knowledge module tended to drink more alcohol per week, with 29 students (60.4%) consuming more than 10-units per week as compared with the students who did receive the CHD knowledge module, with 18 students (30%) consuming more than 10-units a week, although no difference was seen between the number of students who exceeded the guidelines of 14-units of alcohol per week (The Health Survey for Scotland, 2010) in the group of students who received the CHD knowledge module (n=7, 11.7%)

compared with the students who did not receive the CHD knowledge module (n=5, 10.4%) (p=0.868). Therefore, suggesting that had the sample size in the present study been greater than 108-participants these differences in health behaviours may have been significant, advocating the need for further studies in this area.

#### **4.5. The Relationship Between CHD Knowledge Scores and Health Behaviour Scores**

As previously discussed, the results of this study suggest that no relationship/association exists between CHD knowledge scores and self-reported health behaviour scores of first year female HSC (FE) College students attending South Lanarkshire College. Despite students knowing that lifestyle behaviours increase and decrease the risk of CHD. Therefore, these results insinuate that increased CHD knowledge alone may be insufficient at promoting positive health behaviours, which suggests that other interventions may be necessary to promote positive health behaviour changes (Buckley, 2011). These results are supported by a study by Raupach et al. (2009), which as previously discussed identified that despite students knowledge of smoking-attributable morbidity and mortality being relatively accurate in this study population, 25.1% of male medical students and 20.6% of female medical students in Gottingen and 10.9% of male medical students and 9.1% of female medical students in London were self-reported smokers, suggesting that increased knowledge about health risks associated with lifestyle choices does not independently promote positive health behaviour changes. In addition to this a study by Kang et al. (2010) also identified that the cardiovascular disease knowledge of 157 participants diagnosed with coronary artery disease, had no influence on the participants positive health behaviours, therefore supporting the results of the present study; that no relationship exists between a person's level of CHD knowledge and their positive health behaviours.



However, these results are contradictory to the results of Jones (2010) and Koutoubi et al. (2005), which both identified a positive correlation between participants CHD knowledge levels and positive lifestyle behaviours. Jones (2010) identified a significant weak positive correlation between CHD knowledge and positive lifestyle behaviours of 279 students ( $R=0.13$ ) and Koutoubi et al. (2005) identified that an inverse correlation existed between CHD knowledge and positive health behaviours of 300 college students ( $r=0.392$ ), suggesting that increased CHD knowledge does promote positive lifestyle behaviours. Further analysis of the relationship between CHD knowledge scores and health behaviour scores, only considering the scores of the students within the top 10 CHD knowledge scores and the students within the bottom 10 CHD knowledge scores, revealed a slight shift in the scatter graph, although not significant (ratio data, failed normality, Spearman's Rho conducted,  $p=0.248$ ) (Conar, 1998) (See Appendix 9). With students who had the top 10 CHD knowledge scores possessing slightly greater health behaviour scores and students in the bottom 10 CHD knowledge scores possessing slightly lower health behaviour scores. Therefore suggesting that either the association between CHD knowledge and health behaviours is only evident at the extremes of CHD knowledge or that had the sample size in the present study been greater the results of this study may have identified a significant relationship between CHD knowledge and health behaviours in support of the studies by Jones (2010) and Koutoubi et al. (2005).

#### **4.6. Study Limitations**

This study had a number of limitations, which may limit the validity and significance of the results obtained. This study used convenience sampling and had a relatively small sample size of only 108 participants, thus the results obtained from this study may not be a true representation of the wider population and as this study only involved female students, the results from this study cannot be generalised to the male population. However, the main limitation of this study is that the student groups were pre-determined by the students chosen course of study and as such the participants in

this study were not randomised, thus the findings from this study may have occurred due to variables other than those being investigated in the present study. Another limitation of this study is the use of the modified CHD knowledge and self-reported health behaviour questionnaire, which although based on two validated questionnaires and the remaining questions being included in a number of previous studies, the questionnaire itself was not a validated measure of CHD knowledge and self-reported health behaviours. In addition to this, the use of questions from five sources again reduces the validity of the questionnaire, with variations in the wording of these questions from one author to another possibly affecting the results collated. With the inclusion of closed multiple choice questions possibly resulting in students guessing answers, thus producing false CHD knowledge scores, although the inclusion of the '*do not know*' option was included to reduce this as much as possible. This study had no follow-up period, like many studies in this area, which makes it difficult to determine the more long-term effects of a CHD knowledge module on CHD knowledge and health behaviours. Lastly, questionnaires rely on what participants chose to report and as such are susceptible to bias, which may affect the validity of these results (Hughes et al. 2002).

#### **4.7. Future Recommendations**

The results of this study suggest that educational interventions may be effective at increasing an individual's CHD knowledge but this increased CHD knowledge may not endorse positive lifestyle behaviour changes. Therefore suggesting that educational interventions alone may not be the most effective intervention for promoting positive lifestyle behaviour changes and future research should therefore focus on investigating the effectiveness of other interventions, such as motivational interviewing, on their own or in addition to educational interventions in promoting positive lifestyle behaviour changes (Bundy, 2004). However, it is important to note that current research in this area is limited, with recent studies displaying considerable heterogeneity, small sample sizes, limited follow-up periods and methodological flaws, thus advocating the need for further longitudinal studies in this area before any clear conclusions can be drawn with regards to

the most effective intervention for promoting and maintaining positive lifestyle behaviour changes (AACVPR, 2006).

In order to achieve more valid and significant results in this area, future studies in this area should ensure that they have an adequately sized sample group, possess an adequate follow-up period and that participants are randomised appropriately to ensure that any result obtained is directly related to the variables being studied (AACVPR, 2006). The development and implementation of only fully validated CHD knowledge and health behaviour questionnaires, which use open-ended questions, may also produce more valid and significant results (Kayanyil et al. 2009).

# **CHAPTER 5**

## **CONCLUSION**

## **CHAPTER 5: CONCLUSION**

To conclude the results of this study identified a significant difference in CHD knowledge scores of students who had received a CHD knowledge module (median score of 36/52) as compared to students who had not received a CHD knowledge module (median score 31/52), which suggests that CHD educational interventions may be effective at increasing the short-term CHD knowledge of college aged females living in Scotland ( $p=0.0001$ ). However, the results of this study also suggest that this increased CHD knowledge associated with CHD education did not contribute to an increase in the number of positive health behaviours an individual possessed ( $p=0.742$ ). Therefore, suggesting that CHD knowledge alone does not predict positive health behaviour changes and other interventions may be required to promote positive health behaviour changes. No relationship was found between an individual's level of CHD knowledge and the number of positive health behaviours they possessed, again supporting the theory that CHD knowledge alone does not predict positive health behaviour changes ( $p=0.057$ ). However, as this study had no follow-up period it is difficult to ascertain the long-term effects that an educational intervention aimed at increasing CHD knowledge may have on CHD knowledge and positive health behaviours, advocating the need for more longitudinal studies. Further analyses of these results suggested that there may be an association/relationship between the CHD knowledge and health behaviours of students at the extremes of the CHD knowledge spectrum. With the lack of randomisation of participants and the small sample size of 108-participants possibly limiting the validity of the results collated. Therefore, advocating the need for further research in this area before any clear conclusions can be made.

# **CHAPTER 6**

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# **CHAPTER 7**

## **APPENDICES**

## Appendix 1



South  
Lanarkshire  
College  
**East Kilbride**

Principal: **Stewart McKillop** MA(Hons), Dip Acc, Dip Ed

14<sup>th</sup> March 2011

Ethics Committee  
Chester University

To Whom It May Concern

I can confirm that I have read the research proposal CHD knowledge of college students submitted by Miss J. Lyle as part of the MSC cardiovascular rehabilitation programme. I am happy for Miss Lyle to attend South Lanarkshire College and interview Health Care students.

Yours faithfully,

Wilma MacLeod  
Depute Head of Faculty - Care

## Appendix 2



This questionnaire contains 3 sections relating to demographics, personal health and coronary heart disease. It should take no longer than 15 minutes to complete.

### Section 1: Demographics

1. Has a doctor, nurse or other health professional ever told you that you have heart disease or cardiovascular disease? (✓ tick one)

☐ Yes (If you have answered yes to this question please stop and notify the researcher)

☐ No

2. Do you have a family history of coronary heart disease (i.e. your father or brother was diagnosed with heart disease before they were 55-years old or your mother or sister was diagnosed with coronary heart disease before they were 65-years old)? (✓ tick one)

☐ Yes

☐ No

☐ Don't Know

3. What is your age (years)? .....



**4. What is your race/ethnicity? (✓ tick one)**

- ☐ White  
☐ Black  
☐ Asian  
☐ Mixed  
☐ Other (please specify) .....

**5. Does your course of study cover any health or nutrition related topics? (✓ tick one)**

- ☐ Yes  
☐ No

**Section 2: Your Personal Health**

**6. What is your height (approximately)?**

..... Centimetres (e.g. 170cm)

**Or**

..... Feet and ..... Inches (e.g. 5 feet 6 inches)

**7. What is your weight (approximately)?**

..... Kilograms (Kg) (e.g. 55 kg)

**Or**

..... Stones and ..... pounds (e.g. 8 stone 10 pounds)

**8. Do you smoke? (✓ tick one)**

- ☐ Yes  
☐ No

**9. In a typical week, on how many days do you do moderate physical activities (refers to activities that take moderate physical effort and make you breathe somewhat harder than normal such as carrying light loads or yoga) and for how long at time do you perform these activities?**

..... days/week      ..... minutes/session

- 10. In a typical week, on how many days do you do vigorous physical activities (refers to activities that take hard physical effort and make you breathe much harder than normal such as heavy lifting or aerobics) and for how long at time do you perform these activities?**

..... days/week      ..... minutes/session

- 11. How would you describe your current stress levels (where very good means you never feel stressed and very poor means you always feel stressed)? (✓ tick one)**

- ☐ Very Good  
☐ Good  
☐ Fair  
☐ Poor  
☐ Very Poor

- 12. Do you drink alcohol? (✓ tick one)**

- ☐ Yes (Go to question 13)  
☐ No (Go to question 14)

- 13. On average how many units of alcohol do you consume in a typical week? (a unit is half a pint of normal strength beer (4%), a single 25ml measure of spirits or a 125ml glass of wine)? (✓ tick one)**

- ☐ Less than 4  
☐ 5-9  
☐ 10-14  
☐ More than 14

- 14. Do you make a conscious effort to try and eat foods that are high in fibre (such as wholegrain, nuts and seeds)? (✓ tick one)**

- ☐ Yes  
☐ No

- 15. Do you make a conscious effort to try and avoid foods high in Saturated and Trans fats (such as, chocolate, cakes and fast food)? (✓ tick one)**

- ☐ Yes  
☐ No

16. How many servings of fruit and vegetables do you eat a day? .....

17. Do you or the person who cooks your meals, regularly add salt to them when they are cooking? (✓ tick one)

☐ Yes

☐ No

☐ Don't know

18. Do you regularly add salt to your meals at the table? (✓ tick one)

☐ Yes

☐ No

### **Section 3: Your Coronary Heart Disease Knowledge**

19. What is Coronary Heart Disease? (✓ tick one)

☐ Chest Pain

☐ A Valve Problem

☐ Reduced Blood Flow to the Heart

☐ Malfunction of the Heart

☐ Don't Know

☐ Other (specify) .....

20. From the list below, what do you think presents the greatest risk of death in men? (✓ tick one)

☐ Prostate Cancer

☐ Trachea, Bronchus and Lung Cancer

☐ Heart Disease/Heart Attack

☐ Don't Know

☐ Other (specify) .....

**21. From the list below, what do you think presents the greatest risk of death in women? (✓ tick one)**

- ☐ Breast Cancer
- ☐ Trachea, Bronchus and Lung Cancer
- ☐ Heart Disease/Heart Attack
- ☐ Don't Know
- ☐ Other (specify) .....

**22. To reduce your blood cholesterol level do you think you should eat less: (✓ tick one box for each food group)**

Foods	Yes	No	Don't Know
Cakes & Biscuits			
Skimmed Milk			
Ice Cream			
The Fat on Meat			
Sugar			
Bread			
Peanuts			
Coconut			
Avocados			

**23. To reduce your cholesterol it is important to eat less? (✓ tick one)**

- ☐ Saturated Fat
- ☐ Cholesterol
- ☐ Don't Know

**24. Which has less fat? (✓ tick one)**

- ☐ Butter
- ☐ Margarine
- ☐ They are Equal
- ☐ Don't Know

25. Are These Foods Low in Fat? (✓ tick one box for each food group)

Foods	Yes	No	Don't Know
Muesli			
Spaghetti			
Rice			
Bread			
Nuts			
Margarine			
Olive Oil			
Chocolate			

26. Do These Foods Contain Fibre? (✓ tick one box for each food group)

Foods	Yes	No	Don't Know
Steak			
Baked Beans			
Apple Juice			
Bread			
Fish			
Oranges			

Please circle T (true), F (false) or DK (don't know) for each of the statements below:

27. A person always knows when they have heart disease	T	F	DK
28. If you have a family history of heart disease, you are at risk of developing heart disease	T	F	DK
29. The older a person is, the greater their risk of having heart disease	T	F	DK
30. Smoking is a risk factor for heart disease	T	F	DK
31. A person who stops smoking will lower their risk of developing heart disease	T	F	DK
32. High blood pressure is a risk factor for heart disease	T	F	DK
33. Keeping blood pressure under control will reduce a person's risk for developing heart disease	T	F	DK
34. High cholesterol is a risk factor for heart disease	T	F	DK
35. Eating fatty foods does not affect blood cholesterol levels	T	F	DK
36. If your 'good' cholesterol (HDL) is high you are at risk for heart disease	T	F	DK
37. If your 'bad' cholesterol (LDL) is high you are at risk for heart disease	T	F	DK
38. Being overweight increases a person's risk for heart disease	T	F	DK
39. Regular physical activity will lower a person's chance of getting heart disease	T	F	DK
40. Only exercising at a gym or in an exercise class will lower a person's chance of developing heart disease	T	F	DK
41. Walking and gardening are considered exercise that will help lower a person's chance of developing heart disease	T	F	DK
42. Diabetes is a risk factor for developing heart disease	T	F	DK
43. A person who has Diabetes can reduce their risk of developing heart disease if they keep their blood sugar levels under control	T	F	DK
44. People with diabetes rarely have high cholesterol	T	F	DK
45. Men with diabetes have a higher risk of heart disease than women with diabetes	T	F	DK
46. Heart disease is as dangerous for women as it is for men	T	F	DK
47. Everyone who has a heart attack experiences chest pain	T	F	DK
48. A person can reduce their chances of dying from heart disease through lifestyle changes	T	F	DK
49. Daily aspirin is often recommended to reduce heart disease risk	T	F	DK
50. Cholesterol is only found in animal products	T	F	DK

### **Appendix 3**



***Faculty of Applied Sciences***

***Research Ethics Committee***

Tel 01244 511740

Fax 01244 511302

frec@chester.ac.uk

Jacqueline Lyle

20<sup>th</sup> May 2011

Dear Jacqueline,

**Study title:** Coronary Heart Disease (CHD) Knowledge and Self-Reported Health of Students attending a Scottish College.

**FREC reference:** 525/11/JL/CS

**Version number:** 1

Thank you for sending your application to the Faculty of Applied Sciences Research Ethics Committee for review.

I am pleased to confirm ethical approval for the above research, provided that you comply with the conditions set out in the attached document, and adhere to the processes described in your application form and supporting documentation.

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application Form	1	March 2011
Appendix 1 – List of References	1	March 2011
Appendix 2 – C.V. for Lead Researcher	1	March 2011
Appendix 3 – Participant Information Sheet	1	March 2011
Appendix 4 – Written Permission – South Lanarkshire College	1	March 2011
Appendix 5 – Questionnaire	1	March 2011
Appendix 6 – Scoring System	1	March 2011

With the Committee's best wishes for the success of this project.

Yours sincerely,

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**Simon Alford**

Chair, Faculty Research Ethics Committee

*Enclosures     Standard conditions of approval.*

c.c.     Supervisor

FREC Representative

#### **Appendix 4**





## **Participant information sheet**

### **Coronary Heart Disease (CHD) Knowledge and Self-Reported Health of female students attending a Scottish College.**

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

#### **What is the purpose of the study?**

The purpose of this study is to learn more about what female students undertaking various courses know about coronary heart disease and whether this affects the lifestyle choices they make. The study will involve one session of approximately 15-minutes duration.

#### **Why have I been chosen?**

You have been chosen because you are a female student aged over 16 attending South Lanarkshire College.

#### **Do I have to take part?**

It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep. If you decide to take part you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect you in any way.

#### **What will happen to me if I take part?**

You will complete a questionnaire containing 3-sections. Section 1 contains questions about you (e.g age, ethnicity), section 2 contains questions about your lifestyle choices (e.g. diet and exercise habits) and section 3 contains a series of questions about your knowledge of heart disease. Don't worry about being right or wrong, just tell me what you know. If you are not sure it is ok to mark "I don't know". So no one will be able to tell that it was you who gave this information and the information will be kept confidential.

#### **What are the possible disadvantages and risks of taking part?**

Answering survey questions do not pose any obvious or physical risks.

#### **What are the possible benefits of taking part?**

The only direct benefit to you will be a possible increase in heart disease knowledge as you will be given detailed answers to the questions you were asked at the end of the study. In addition to this, your participation could help us better understand the level of heart disease knowledge and personal health of female students and identify effective ways to improve these.

**What if something goes wrong?**

If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact Professor Sarah Andrew, Dean of the Faculty of Applied Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ, 01244 513055.

**Will my taking part in the study be kept confidential?**

The questionnaire responses are anonymous so you will not be asked for your name, address or phone number. All information which is collected about you during the course of the research will be kept strictly confidential so that only the researcher carrying out the research will have access to such information.

**What will happen to the results of the research study?**

The results will be written up into a dissertation for my final project of my MSc. Individuals who participate will not be identified in any subsequent report or publication.

**Who is organising the research?**

The research is conducted as part of a MSc in Cardiovascular Rehabilitation within the Department of Clinical Sciences at the University of Chester. The study is organised with supervision from the department, by Jacqueline Lyle, an MSc student.

**Who may I contact for further information?**

If you would like more information about the research before you decide whether or not you would be willing to take part, please contact:

*Jacqueline Lyle. @chester.ac.uk*

**Thank you for your interest in this research.**

## **Appendix 5**

### **ANSWERS**

#### **Q19. What is coronary heart disease?**

A: Reduced blood flow to the heart

#### **Q20. What do you think presents the greatest risk of death to men?**

A: Heart Disease/ Heart Attack- Accounted for 8,068 deaths in men in Scotland in 2010

#### **Q21. What do you think presents the greatest risk of death to women?**

A: Heart Disease/ Heart Attack- Accounted for 8, 449 deaths in women in Scotland in 2010

#### **Q22. To reduce your cholesterol level do you think you should eat less?**

A: YES FOR CAKES AND BISCUITS, ICE CREAM, THE FAT ON MEAT AND COCONUT. These foods contain saturated fat which increases blood cholesterol levels. Commercial cakes and biscuits commonly contain saturated fat. Suitable low fat commercial alternatives to cakes and biscuits include fruit loaf, crumpets, English muffins, pikelets and scones with jam or honey but no butter, margarine or cream. Homemade cakes and biscuits using mono- or poly-unsaturated fat can be eaten by people who are not overweight. It is better to use an oil when cooking these foods, rather than margarine, as some carbon saturation occurs during the production of margarine.

NO FOR SKIM MILK, SUGAR, BREAD, PEANUTS AND AVOCADO. Although peanuts and avocados have a low saturated fat content and contain predominantly mono-unsaturated fat, they may provide an undesirable energy source for overweight people.

#### **Q23. To reduce your cholesterol it is important to eat less?**

A: TO REDUCE YOUR BLOOD CHOLESTEROL LEVEL IT IS MORE IMPORTANT TO EAT LESS SATURATED FAT THAN TO REDUCE CHOLESTEROL INTAKE.

#### **Q24. Which has less fat?**

A: BUTTER AND MARGARINE CONTAIN AN EQUAL AMOUNT OF FAT. Butter and margarine are both very high in fat although they contain saturated, mono- and poly-unsaturated fat in different proportions. Butter contains the most saturated fat (63%) while mono- and poly-unsaturated margarines contain much less. Many brands of poly-unsaturated margarine contain trans fatty acids which also raise blood cholesterol levels.

**Q25. Are These Foods Low in Fat?**

A: YES FOR SPAGHETTI, RICE AND BREAD. Although the toppings may be high in fat.

NO FOR TOASTED MUESLI, NUTS, MARGARINE, OLIVE OIL AND Chocolate BAR. Toasted muesli is usually toasted in tropical oils and is therefore high in saturated fat. Nuts and seeds are high in fat, containing at least 50% fat. Carob and chocolate bars both have a high fat content.

**Q26. Do These Foods Contain Fibre?**

A: YES FOR BAKED BEANS, BREAD AND ORANGES. Fibre is found only in plant foods (eg. breads, cereals, fruits, legumes, vegetables, seeds and nuts).

NO FOR STEAK, FISH AND APPLE JUICE. The flesh of apples contains fibre but apple juice is strained.

**Q27. A person always knows when they have heart disease?**

A: False- in some individuals this can occur without any symptoms.

**Q28. If you have a family history of heart disease, you are at risk of developing heart disease?**

A: True- A family history of heart disease is a risk factor for developing heart disease.

**Q29. The older a person is, the greater their risk of having heart disease?**

A: True- Advancing age is a risk factor for heart disease.

**Q30. Smoking is a risk factor for heart disease?**

A: True- Smoking is a risk factor for heart disease, it can interactive with and make worse other risk factors.

**Q31. A person who stops smoking will lower their risk of developing heart disease?**

A: True- Stopping smoking will not only reduce the risk of heart disease from smoking alone but also the increased risk associated with the effects smoking has on other risk factors.

**Q32. High blood pressure is a risk factor for heart disease?**

A: True- High blood pressure can place an increased demand on the heart and blood vessels, which can cause damage to them, increasing the risk of developing heart disease.

**Q33. Keeping blood pressure under control will reduce a person's risk for developing heart disease?**

A: True- This will reduce the pressure and damage to the heart and blood vessels, reducing the risk of developing heart disease.

**Q34. High cholesterol is a risk factor for heart disease?**

A: True- High cholesterol has been shown to increase an individual's risk of developing heart disease.

**Q35. Eating fatty foods does not affect blood cholesterol levels?**

A: False- Eating foods high in saturated fat will increase an individual's cholesterol level

**Q36. If your 'good' cholesterol (HDL) is high you are at risk for heart disease?**

A: False the good cholesterol (HDL) is beneficial, it removes the bad cholesterol (LDL), thus the more HDL cholesterol an individual has the lower their risk of developing heart disease.

**Q37. If your 'bad' cholesterol (LDL) is high you are at risk for heart disease?**

A: True- A high level of bad cholesterol (LDL) is a risk factor for developing heart disease.

**Q38. Being overweight increases a person's risk for heart disease?**

A: True- Being overweight places a greater strain on the body and can increase an individual's risk of developing other risk factors for heart disease and heart disease itself.

**Q39. Regular physical activity will lower a person's chance of getting heart disease?**

A: True- Regular physical activity has been shown to be effective at reducing an individual's risk of developing heart disease and other risk factors for heart disease such as; high blood pressure, high blood cholesterol, increased body weight and diabetes.

**Q40. Only exercising at a gym or in an exercise class will lower a person's chance of developing heart disease?**

A: False- Any type of physical activity that increases the number of calories a person uses will lower their risk of developing heart disease.

**Q41. Walking and gardening are considered exercise that will help lower a person's chance of developing heart disease?**

True- Any type of physical activity that increases the number of calories a person uses will lower their risk of developing heart disease.

**Q42. Diabetes is a risk factor for developing heart disease?**

True- Individuals with diabetes are at increased risk of developing heart disease.

**Q43. A person who has Diabetes can reduce their risk of developing heart disease if they keep their blood sugar levels under control?**

A: True- Effective control of an individual's blood sugar levels can significantly reduce their risk of developing heart disease.

**Q44. People with diabetes rarely have high cholesterol?**

A: False- People with diabetes commonly have high blood cholesterol levels.

**Q45. Men with diabetes have a higher risk of heart disease than women with diabetes?**

A: False- Women with diabetes have a greater risk of developing heart disease than men who have diabetes.

**Q46. Heart disease is as dangerous for women as it is for men?**

A: True- Heart disease is one of the leading causes of death in women as well as in men.

**Q47. Everyone who has a heart attack experiences chest pain?**

A: False- There are many symptoms of a heart attack, not everyone experiences chest pain, some feel pain in their jaw or arm and some experience no symptoms or pain at all.

**Q48. A person can reduce their chances of dying from heart disease through lifestyle changes?**

A: True- Stopping smoking, eating a healthy diet, exercising regularly, drinking alcohol in moderations, maintaining a healthy weight and developing stress management techniques can reduce an individual's risk of developing heart disease.

**Q49. Daily aspirin is often recommended to reduce heart disease risk?**

A: True- Aspirin has been shown to reduce the risk of blood clots forming and the possible risk of a cardiac event occurring.

**Q50. Cholesterol is only found in animal products?**

A: True- Cholesterol is found only in animal foods, e.g. meat, poultry, eggs, milk and cheese.

## **Appendix 6**

Test for normality for CHD knowledge scores of students from the CHD knowledge module group and from the no CHD knowledge module group

**Tests of Normality**

Course		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
CHD Knowledge Score Out of 52	No CHD Knowledge Module	.089	47	.200 <sup>*</sup>	.976	47	.449
	CHD Knowledge Module	.115	60	.047	.981	60	.476

a. Lilliefors Significance Correction

\*. This is a lower bound of the true significance.

Test of homogeneity of variance for CHD knowledge scores of students from the CHD knowledge module group and from the no CHD knowledge module group

**Test of Homogeneity of Variance**

		Levene Statistic	df1	df2	Sig.
CHD Knowledge Score Out of 52	Based on Mean	.389	1	105	.534
	Based on Median	.408	1	105	.524
	Based on Median and with adjusted df	.408	1	102.956	.524
	Based on trimmed mean	.392	1	105	.532

Mann Whitney U Test to determine if a significant difference in CHD knowledge scores existed between the two student groups.

**Test Statistics<sup>a</sup>**

	CHD Knowledge Score Percentage
Mann-Whitney U	693.500
Wilcoxon W	1869.500
Z	-4.624
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Course



## **Appendix 7**

Test for normality for health behaviour scores of students from the CHD knowledge module group and from the no CHD knowledge module group

**Tests of Normality**

Course		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Health Behaviour Score (out of 10)	No CHD Knowledge Module	.144	47	.016	.954	47	.060
	CHD Knowledge Module	.145	60	.003	.948	60	.013

a. Lilliefors Significance Correction

Test of homogeneity of variance for health behaviour scores of students from the CHD knowledge module group and from the no CHD knowledge module group

**Test of Homogeneity of Variance**

		Levene Statistic	df1	df2	Sig.
Health Behaviour Score (out of 10)	Based on Mean	.006	1	105	.940
	Based on Median	.003	1	105	.957
	Based on Median and with adjusted df	.003	1	103.588	.957
	Based on trimmed mean	.002	1	105	.966

Mann Whitney U Test to determine if a significant difference in CHD knowledge scores existed between the two student groups.

**Test Statistics<sup>a</sup>**

	Health Behaviour Score (out of 10)
Mann-Whitney U	1387.500
Wilcoxon W	2563.500
Z	-.330
Asymp. Sig. (2-tailed)	.742

a. Grouping Variable: Course

## **Appendix 8**

Test for normality for CHD knowledge scores and health behaviour scores of all students

### **Tests of Normality**

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Health Behaviour Score (out of 10)	.143	108	.000	.956	108	.001
CHD Knowledge Score Out of 52	.084	108	.057	.987	108	.386

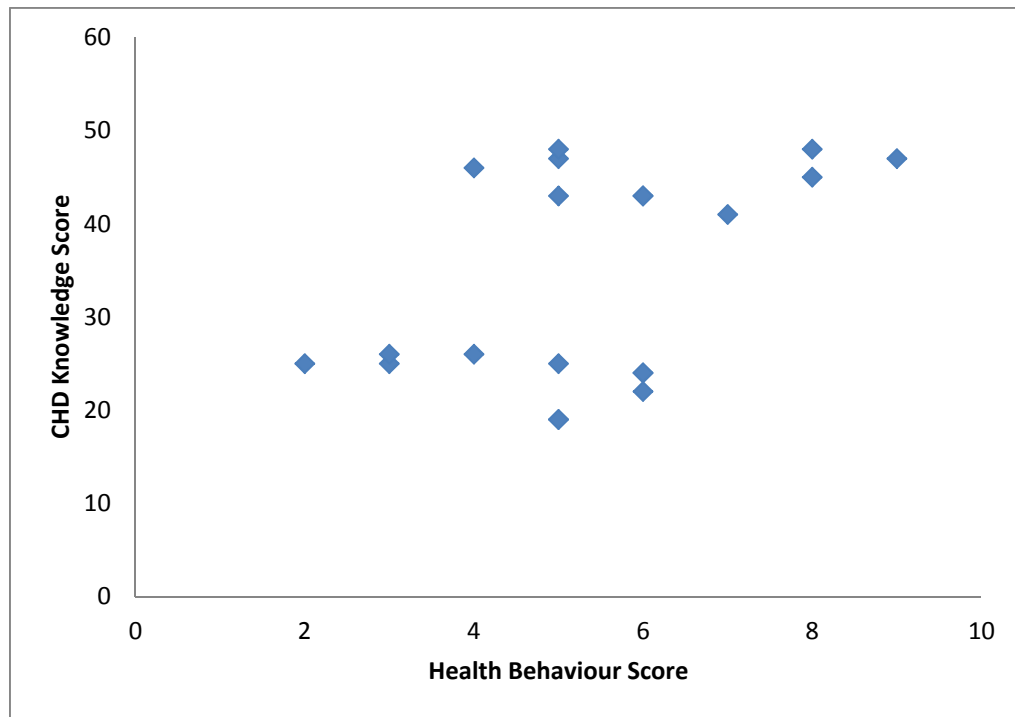
a. Lilliefors Significance Correction

Spearman's Rho Test to determine if a relationship/association exists between students CHD knowledge scores and students health behaviour scores

### **Correlations**

			Health Behaviour Score (out of 10)	CHD Knowledge Score Out of 52
Spearman's rho	Health Behaviour Score (out of 10)	Correlation Coefficient	1.000	.129
		Sig. (2-tailed)	.	.185
		N	108	108
	CHD Knowledge Score Out of 52	Correlation Coefficient	.129	1.000
		Sig. (2-tailed)	.185	.
		N	108	108

### Appendix 9



**Relationship Between CHD knowledge scores (out of a possible score of 52) and Health Behaviour Scores (out of a possible score of 10) of students in the top 10 and bottom 10 CHD knowledge scores of the student population**